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Hussam

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(45) **Date of Patent: Feb. 9, 2016**

(54) **PATIENT-TO-PATIENT COMMUNITIES**

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(73) Assignee: **Universal Research Solutions, LLC**, Columbia, MO (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 191 days.

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(22) Filed: **Aug. 15, 2013**

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(51) **Int. Cl.**
G06F 17/30 (2006.01)
G06F 19/00 (2011.01)

(52) **U.S. Cl.**
CPC ***G06F 17/30477*** (2013.01); ***G06F 19/322*** (2013.01); ***G06F 19/3425*** (2013.01); ***G06F 19/3443*** (2013.01); *G06F 19/327* (2013.01); *G06F 19/3475* (2013.01)

(58) **Field of Classification Search**
CPC G06F 19/3418; G06F 19/345; G06F 19/3443; G06F 19/322; G06F 19/3456; G06F 19/363; G06F 19/3481; G06F 21/6245; G06F 19/3425; G06F 19/3462
See application file for complete search history.

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* cited by examiner

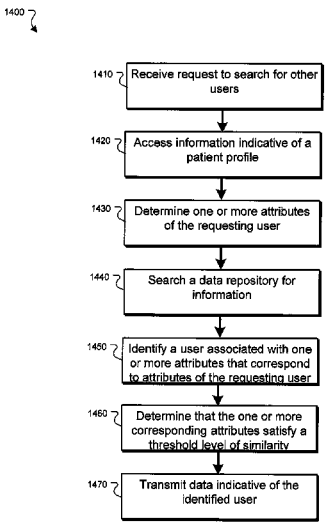
Primary Examiner — Angelica Ruiz

(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57) **ABSTRACT**

A computer-implemented method includes receiving a request to search for other users who are associated with at least a threshold level of similarity to the requesting user; accessing information indicative of a patient profile of the requesting user; determining one or more attributes of the requesting user; searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and transmitting information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user.

18 Claims, 15 Drawing Sheets



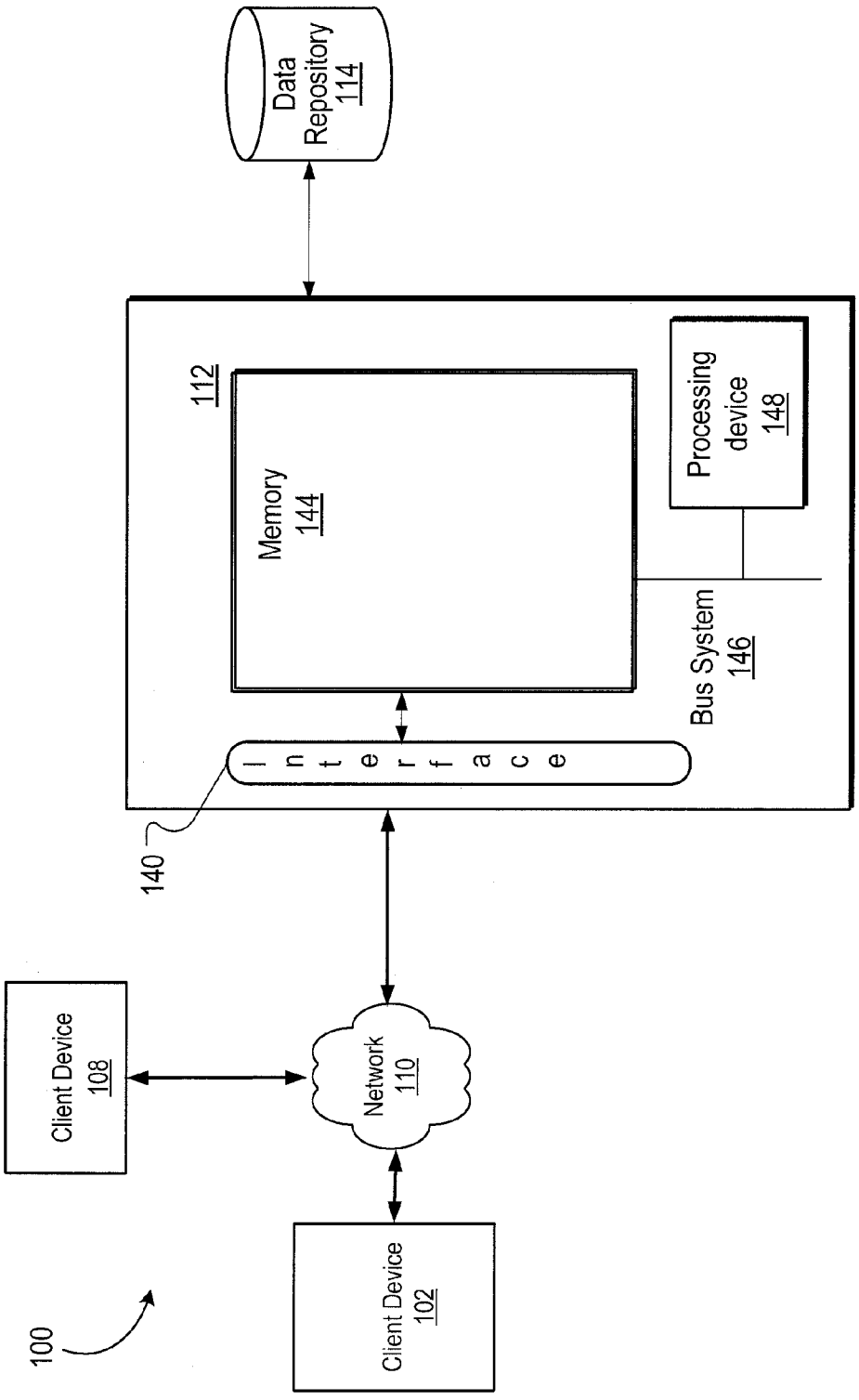

Data Repository 114
112
Memory 144
Processing device 148
Bus System 146
Interface
140
Client Device 108
Network 110
Client Device 102
100

FIG. 1

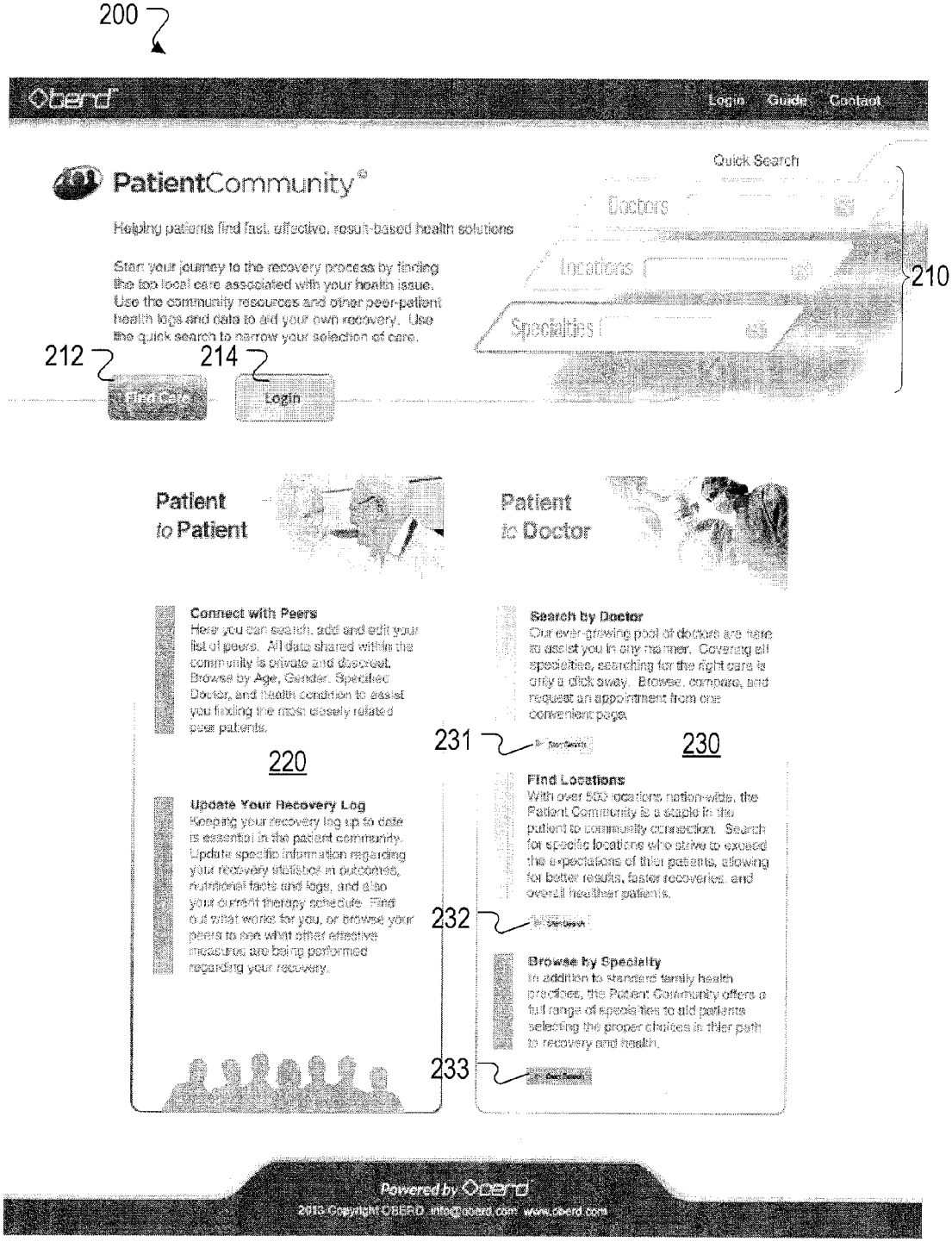

200
Login
Guide
Contact
PatientCommunity®
Helping patients find fast, effective, result-based health solutions
Start your journey to the recovery process by finding the top local care associated with your health issue. Use the community resources and other peer-patient health logs and data to aid your own recovery. Use the quick search to narrow your selection of care.
212
214
Login
Quick Search
Doctors
Locations
Specialities
210
Patient to Patient
Patient to Doctor
Connect with Peers
Here you can search, add and edit your list of peers. All data shared within the community is private and discreet. Browse by Age, Gender, Specific Doctor, and health condition to assist you finding the most closely related peer patients.
220
Update Your Recovery Log
Keeping your recovery log up to date is essential in the patient community. Update specific information regarding your recovery statistics in outcomes, nutritional facts and logs, and also your current therapy schedule. Find out what works for you, or browse your peers to see what other effective measures are being performed regarding your recovery.
Search by Doctor
Our ever-growing pool of doctors are here to assist you in any manner. Covering all specialties, searching for the right care is only a click away. Browse, compare, and request an appointment from one convenient page.
231
230
Find Locations
With over 500 locations nation-wide, the Patient Community is a staple in the patient to community connection. Search for specific locations who strive to exceed the expectations of thier patients, allowing for better results, faster recoveries, and overall healthier patients.
232
Browse by Specialty
In addition to standard family health practices, the Patient Community offers a full range of specialties to aid patients selecting the proper choices in thier path to recovery and health.
233
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FIG. 2

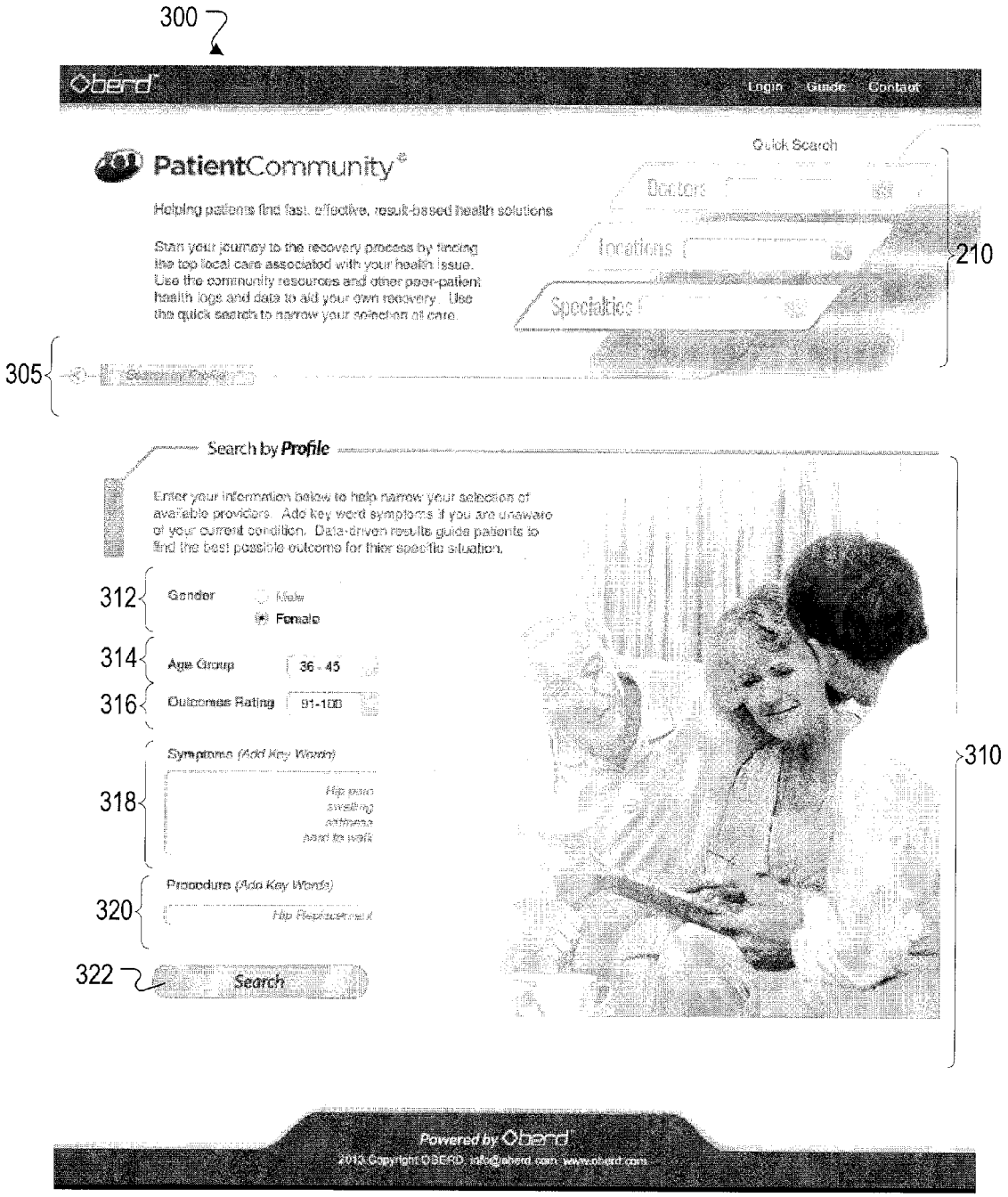
300
Login
Guide
Contact
PatientCommunity
Helping patients find fast, effective, result-based health solutions
Start your journey to the recovery process by finding the top local care associated with your health issue. Use the community resources and other peer-patient health logs and data to aid your own recovery. Use the quick search to narrow your selection of care.
Quick Search
Doctors
locations
Specialties
210
305
Search by Profile
Enter your information below to help narrow your selection of available providers. Add key word symptoms if you are unaware of your current condition. Data-driven results guide patients to find the best possible outcome for their specific situation.
312
Gender
Male
Female
314
Age Group
36 - 45
316
Outcomes Rating
91-100
Symptoms (Add Key Words)
318
Hip pain
swelling
arthritis
hard to walk
Procedure (Add Key Words)
320
Hip Replacement
322
Search
310
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FIG. 3

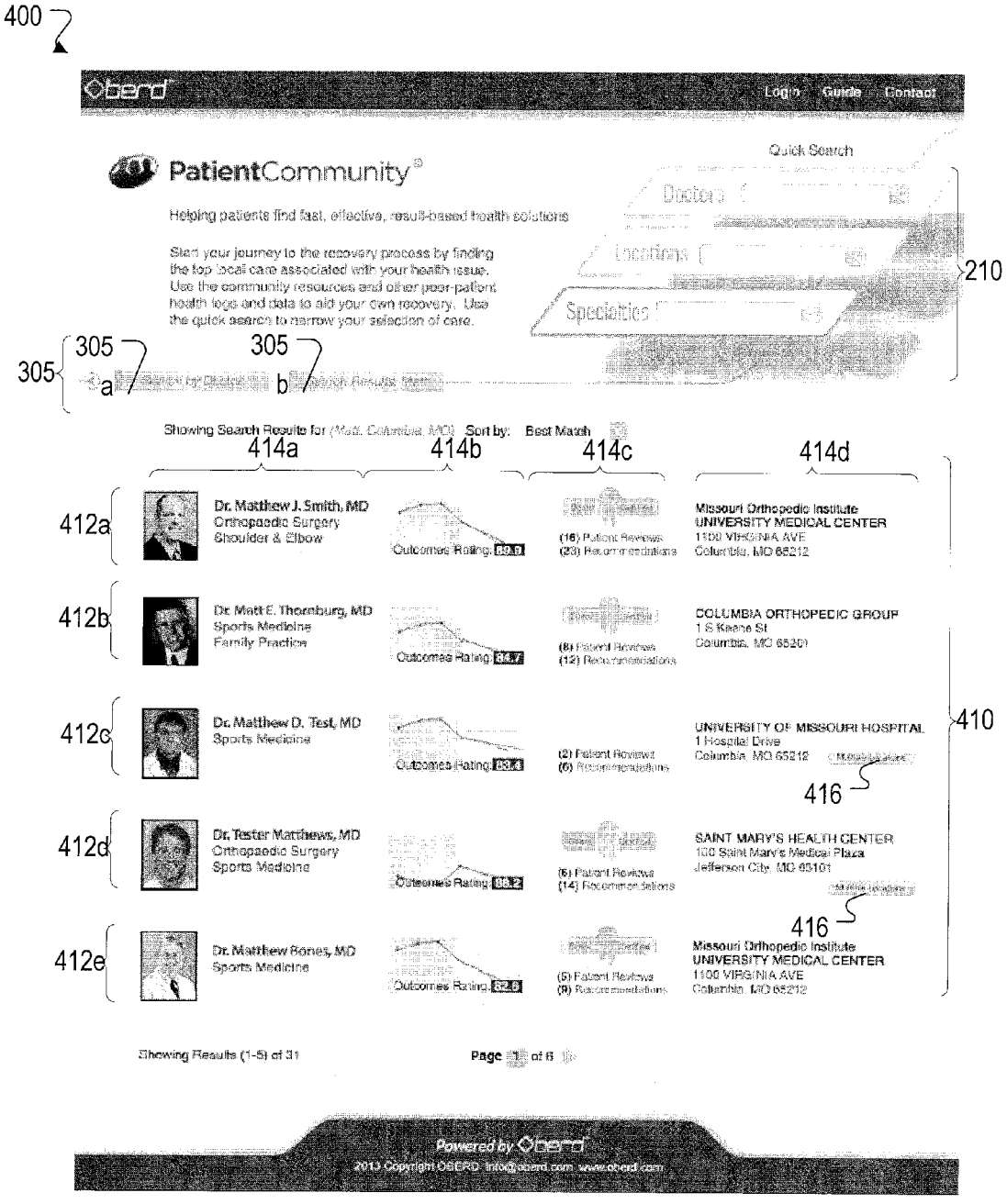
400
Login
Guide
Contact
PatientCommunity®
Helping patients find fast, effective, result-based health solutions
Start your journey to the recovery process by finding the top local care associated with your health issue. Use the community resources and other peer-patient health logs and data to aid your own recovery. Use the quick search to narrow your selection of care.
Quick Search
Doctors
Locations
Specialties
210
305
305a
305b
Showing Search Results for (Matt, Columbia, MO) Sort by: Best Match
414a
414b
414c
414d
412a
Dr. Matthew J. Smith, MD
Orthopaedic Surgery
Shoulder & Elbow
Outcomes Rating: 99.9
(16) Patient Reviews
(23) Recommendations
Missouri Orthopedic Institute
UNIVERSITY MEDICAL CENTER
1100 VIRGINIA AVE
Columbia, MO 65212
412b
Dr. Matt E. Thornburg, MD
Sports Medicine
Family Practice
Outcomes Rating: 99.7
(8) Patient Reviews
(12) Recommendations
COLUMBIA ORTHOPEDIC GROUP
1 S Keene St
Columbia, MO 65201
412c
Dr. Matthew D. Test, MD
Sports Medicine
Outcomes Rating: 99.4
(2) Patient Reviews
(6) Recommendations
UNIVERSITY OF MISSOURI HOSPITAL
1 Hospital Drive
Columbia, MO 65212
416
410
412d
Dr. Tester Matthews, MD
Orthopaedic Surgery
Sports Medicine
Outcomes Rating: 99.2
(5) Patient Reviews
(14) Recommendations
SAINT MARY'S HEALTH CENTER
100 Saint Mary's Medical Plaza
Jefferson City, MO 65101
416
412e
Dr. Matthew Bones, MD
Sports Medicine
Outcomes Rating: 92.8
(5) Patient Reviews
(9) Recommendations
Missouri Orthopedic Institute
UNIVERSITY MEDICAL CENTER
1100 VIRGINIA AVE
Columbia, MO 65212
Showing Results (1-5) of 31
Page 1 of 6
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FIG. 4

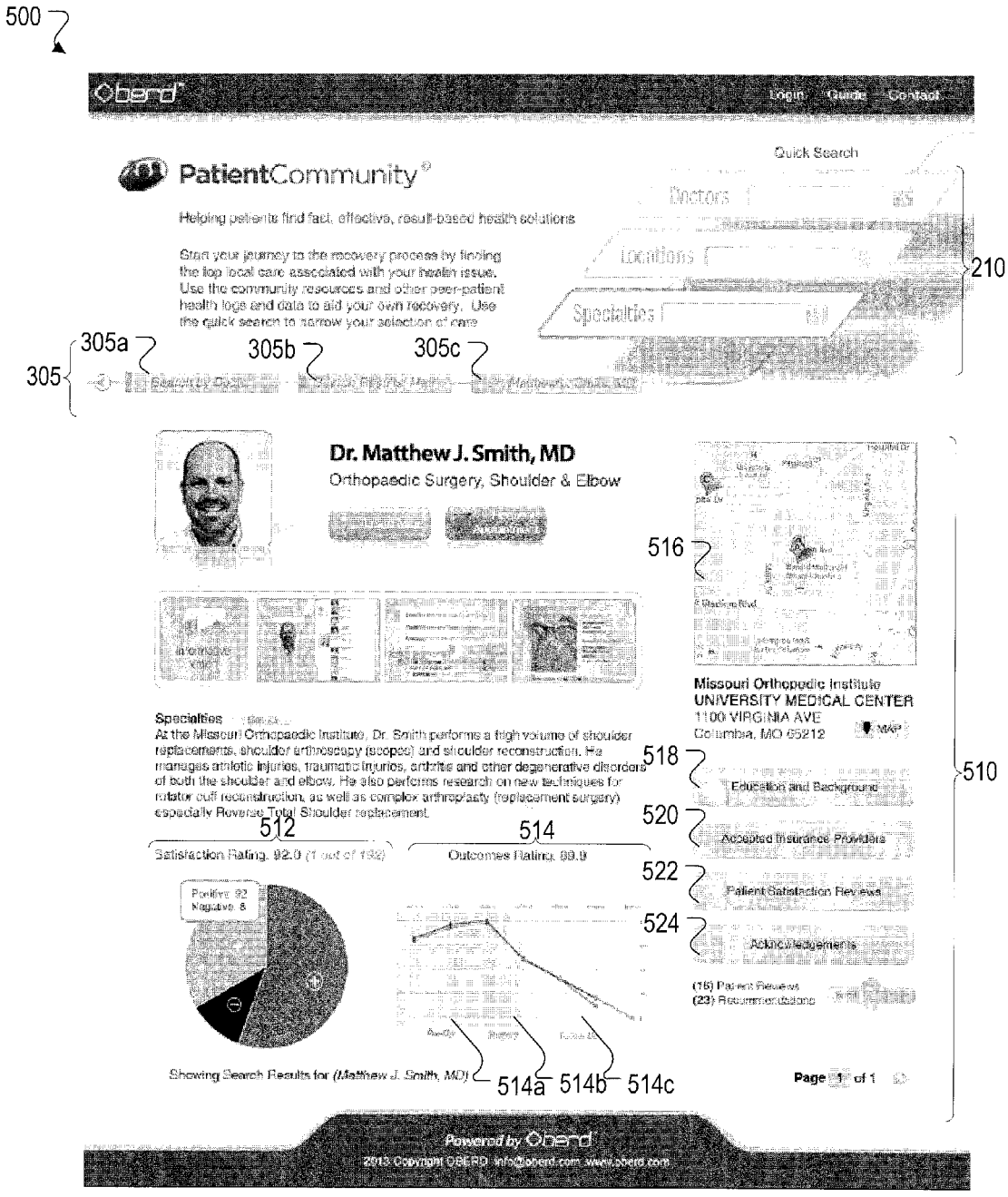
500
Login
Guide
Contact
PatientCommunity®
Helping patients find fast, effective, result-based health solutions
Start your journey to the recovery process by finding the top local care associated with your health issue. Use the community resources and other peer-patient health logs and data to aid your own recovery. Use the quick search to narrow your selection of care
Quick Search
Doctors
Locations
Specialties
210
305
305a
305b
305c
Dr. Matthew J. Smith, MD
Orthopaedic Surgery, Shoulder & Elbow
516
Missouri Orthopedic Institute
UNIVERSITY MEDICAL CENTER
1100 VIRGINIA AVE
Columbia, MO 65212
Specialties
At the Missouri Orthopaedic Institute, Dr. Smith performs a high volume of shoulder replacements, shoulder arthroscopy (scopes) and shoulder reconstruction. He manages athletic injuries, traumatic injuries, arthritis and other degenerative disorders of both the shoulder and elbow. He also performs research on new techniques for rotator cuff reconstruction, as well as complex arthroplasty (replacement surgery) especially Reverse Total Shoulder replacement.
518
Education and Background
520
Accepted Insurance Providers
522
Patient Satisfaction Reviews
524
Acknowledgements
510
512
Satisfaction Rating: 92.0
514
Outcomes Rating: 99.0
Positive: 92
Negative: 8
(15) Patient Reviews
(23) Recommendations
Showing Search Results for (Matthew J. Smith, MD)
514a
514b
514c
Page 1 of 1
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FIG. 5

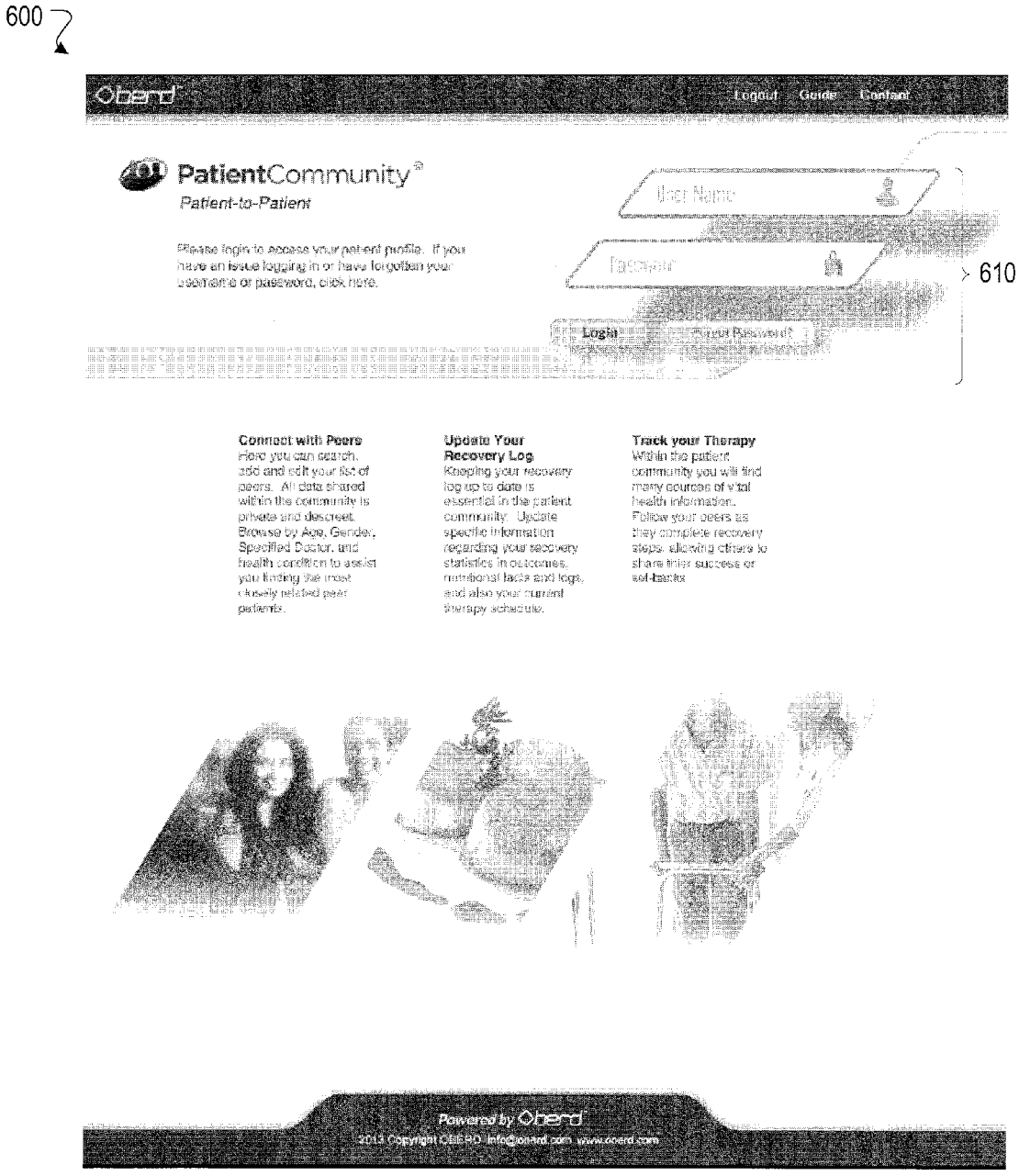
600
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Please login to access your patient profile. If you have an issue logging in or have forgotten your username or password, click here.
User Name
Password
610
Login
Forgot Password?
Connect with Peers
Here you can search, add and edit your list of peers. All data shared within the community is private and discreet. Browse by Age, Gender, Specified Doctor, and health condition to assist you finding the most closely related peer patients.
Update Your Recovery Log
Keeping your recovery log up to date is essential in the patient community. Update specific information regarding your recovery statistics in outcomes, nutritional facts and logs, and also your current therapy schedule.
Track your Therapy
Within the patient community you will find many courses of vital health information. Follow your peers as they complete recovery steps, allowing others to share their success or set-backs
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FIG. 6

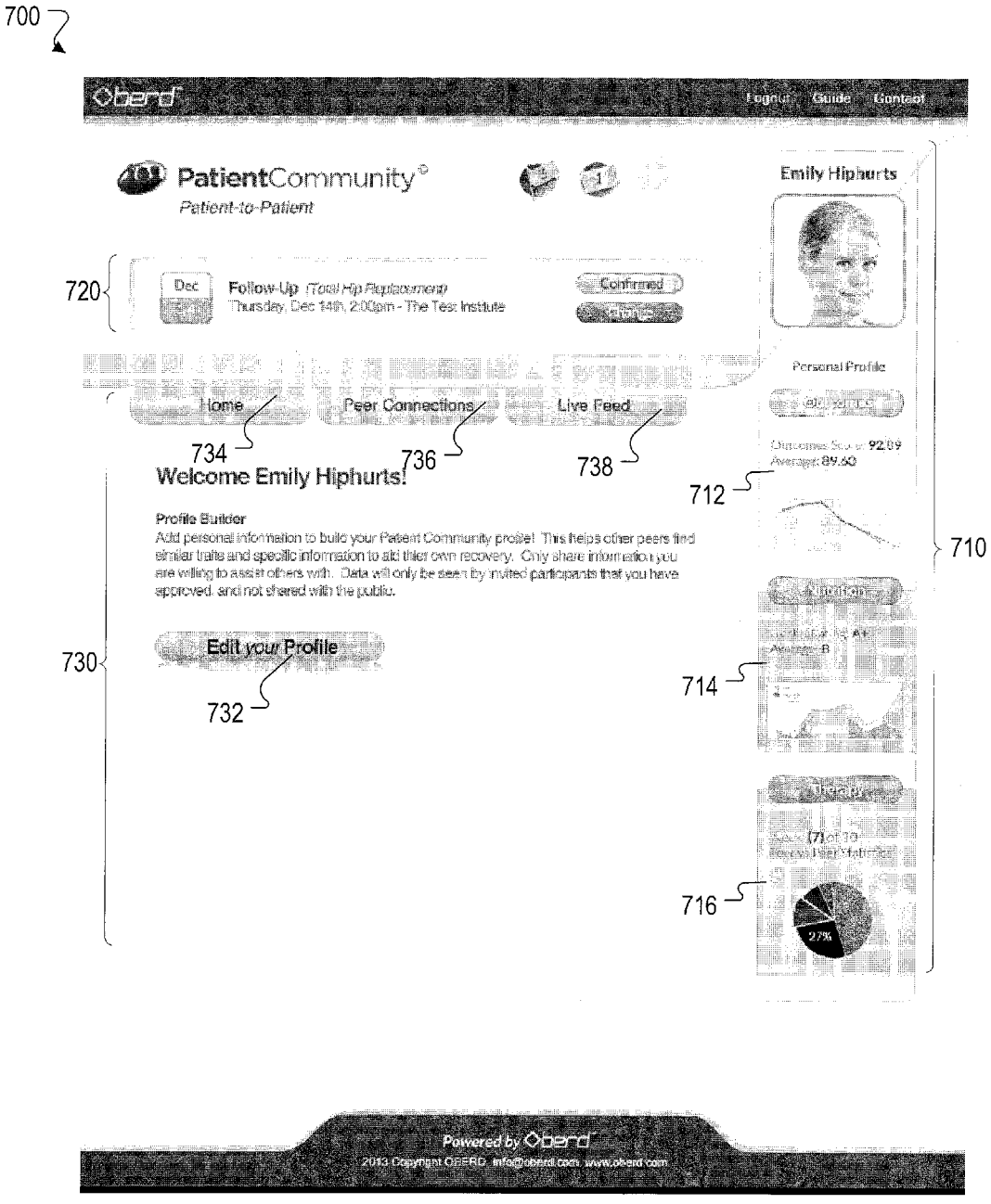
700
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Emily Hiphurts
720
Dec
Follow-Up (Total Hip Replacement)
Thursday, Dec 14th, 2:00pm - The Test Institute
Confirmed
Personal Profile
Home
Peer Connections
Live Feed
734
736
738
Welcome Emily Hiphurts!
712
Profile Builder
Add personal information to build your Patient Community profile! This helps other peers find similar traits and specific information to aid their own recovery. Only share information you are willing to assist others with. Data will only be seen by invited participants that you have approved, and not shared with the public.
710
730
Edit your Profile
732
714
716
27%
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FIG. 7

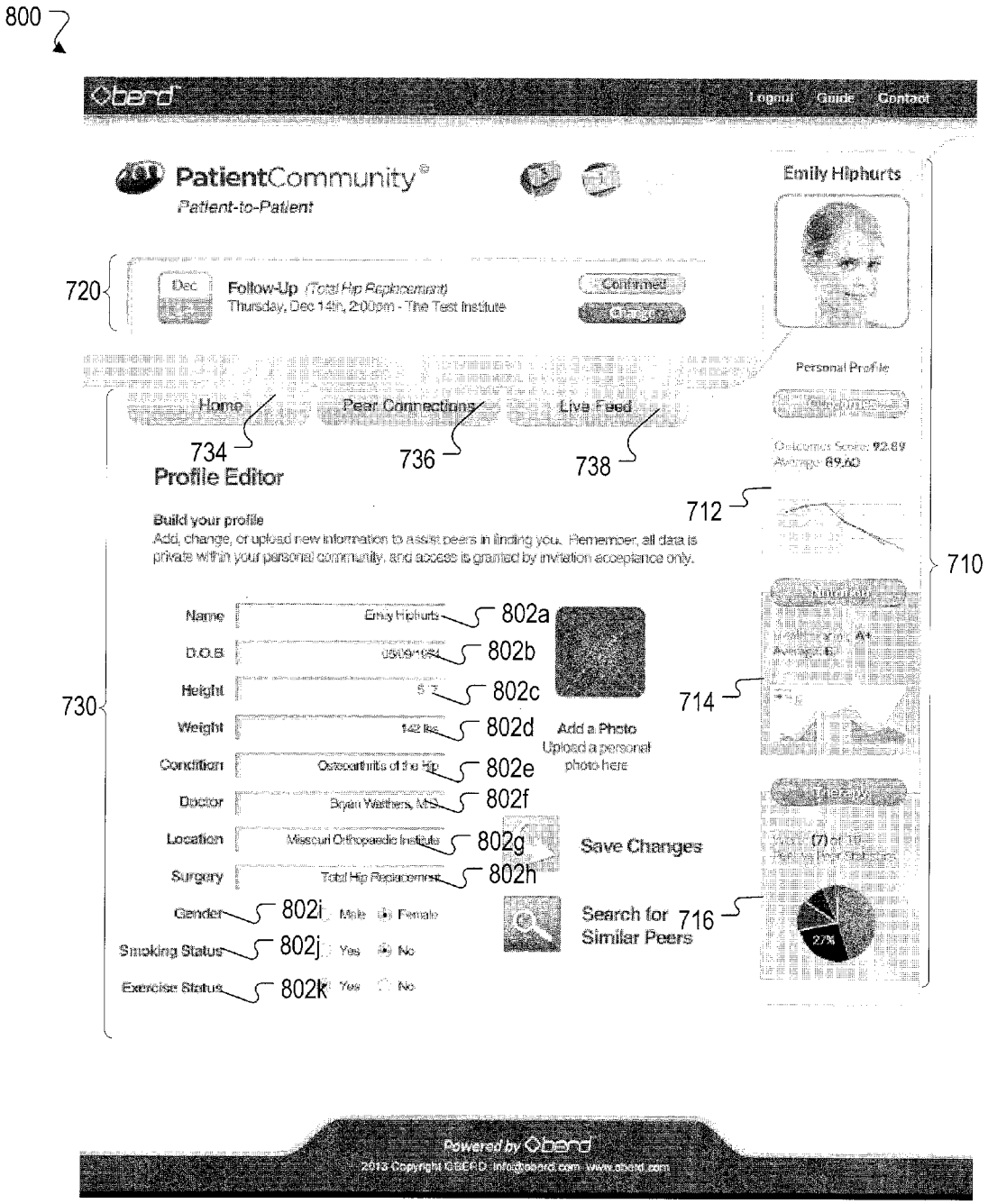
800
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Emily Hiphurts
720
Dec
Follow-Up (Total Hip Replacement)
Thursday, Dec 14th, 2:00pm - The Test Institute
Confirmed
Personal Profile
Home
Peer Connections
Live Feed
734
736
738
Profile Editor
Build your profile
Add, change, or upload new information to assist peers in finding you. Remember, all data is private within your personal community, and access is granted by invitation acceptance only.
712
710
Name
Emily Hiphurts
802a
D.O.B
802b
Height
802c
730
Weight
142 lbs
802d
Add a Photo
Upload a personal photo here
714
Condition
Osteoarthritis of the Hip
802e
Doctor
Bryan Walthers, M.D.
802f
Location
Missouri Orthopaedic Institute
802g
Save Changes
Surgery
Total Hip Replacement
802h
Gender
802i
Male
Female
Smoking Status
802j
Yes
No
Exercise Status
802k
Yes
No
Search for Similar Peers
716
27%
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FIG. 8

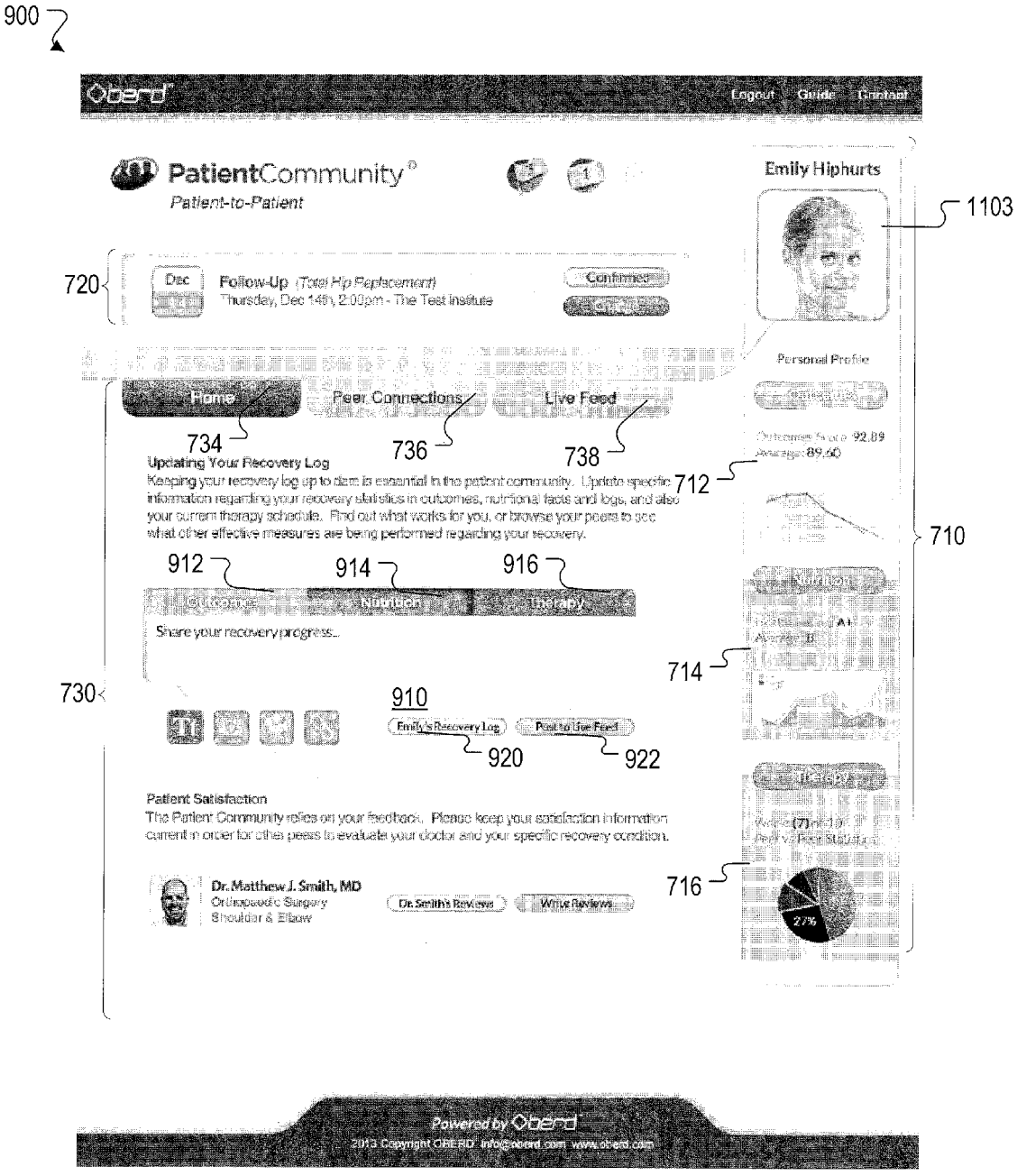
900
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Emily Hiphurts
1103
720
Follow-Up (Total Hip Replacement)
Thursday, Dec 14th, 2:00pm - The Test Institute
Confirmed
Personal Profile
Home
Peer Connections
Live Feed
734
736
738
Updating Your Recovery Log
712
912
914
916
Outcomes
Nutrition
Therapy
Share your recovery progress...
710
730
910
Emily's Recovery Log
Post to Live Feed
920
922
714
Patient Satisfaction
The Patient Community relies on your feedback. Please keep your satisfaction information
Dr. Matthew J. Smith, MD
Orthopaedic Surgery
Shoulder & Elbow
Dr. Smith's Reviews
Write Reviews
716
27%
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FIG. 9

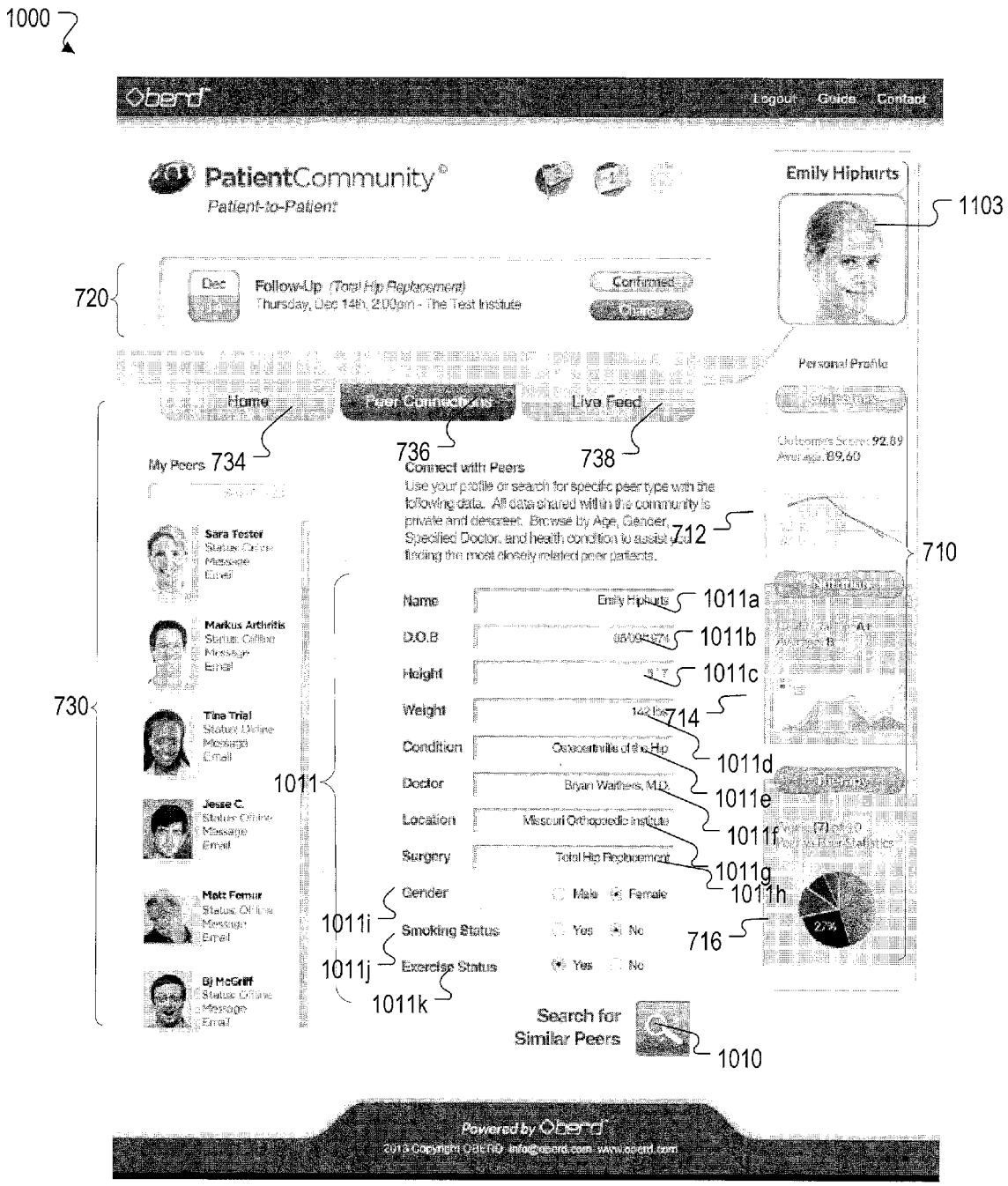
1000
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Emily Hiphurts
1103
720
Follow-Up (Total Hip Replacement)
Thursday, Dec 14th, 2:00pm - The Test Institute
Confirmed
Change
Personal Profile
Home
Peer Connections
Live Feed
My Peers 734
736
738
Connect with Peers
Use your profile or search for specific peer type with the following data. All data shared within the community is private and descreet. Browse by Age, Gender, Specified Doctor, and health condition to assist you finding the most closely related peer patients.
712
710
Sara Tester
Markus Arthritis
Tina Trial
Jesse C.
Matt Femur
Bj McGriff
730
Name
Emily Hiphurts
1011a
D.O.B
1011b
Height
1011c
Weight
714
Condition
Osteoarthritis of the Hip
1011d
Doctor
Bryan Walters, M.D.
1011e
Location
Missouri Orthopaedic Institute
1011f
Surgery
Total Hip Replacement
1011g
1011h
1011
Gender
Male
Female
1011i
Smoking Status
Yes
No
716
1011j
Exercise Status
Yes
No
1011k
Search for Similar Peers
1010
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FIG. 10

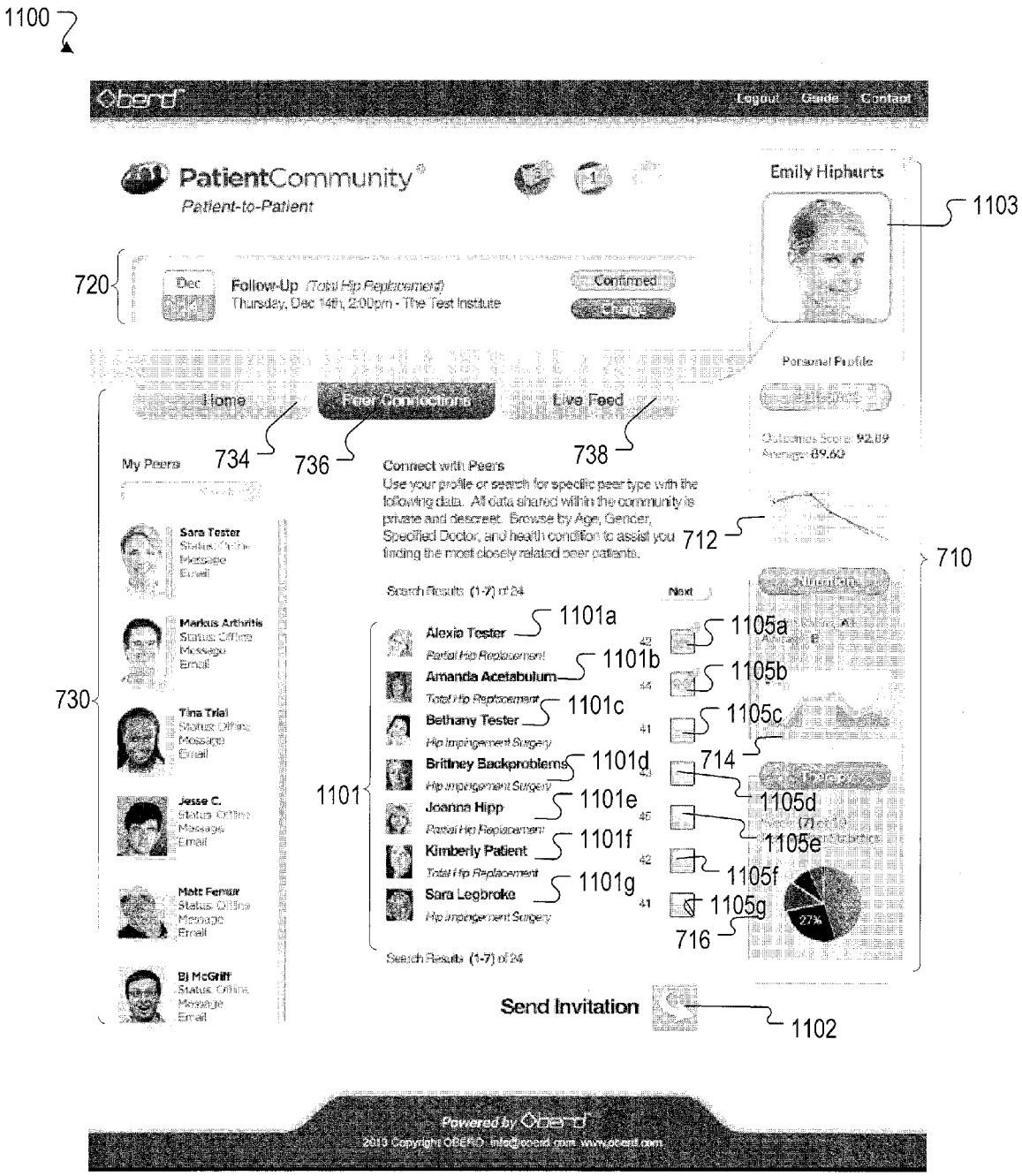
1100
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Emily Hiphurts
1103
720
Dec
Follow-Up (Total Hip Replacement)
Thursday, Dec 14th, 2:00pm - The Test Institute
Confirmed
Change
Personal Profile
Home
Peer Connections
Live Feed
734
736
738
My Peers
Connect with Peers
Use your profile or search for specific peer type with the following data. All data shared within the community is private and descreet. Browse by Age, Gender, Specified Doctor, and health condition to assist you finding the most closely related peer patients.
712
710
730
Sara Tester
Markus Arthritis
Tina Trial
Jesse C.
Matt Ferrair
BI McGriff
Search Results (1-7) of 24
Next
1101a
Alexio Tester
1101b
Amanda Acetabulum
Total Hip Replacement
1101c
Bethany Tester
Hip Impingement Surgery
1101d
Brittney Backproblems
Hip Impingement Surgery
1101e
Joanna Hipp
Partial Hip Replacement
1101f
Kimberly Patient
Total Hip Replacement
1101g
Sara Legbroke
Hip Impingement Surgery
1101
1105a
1105b
1105c
714
1105d
1105e
1105f
1105g
716
Send Invitation
1102
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FIG. 11

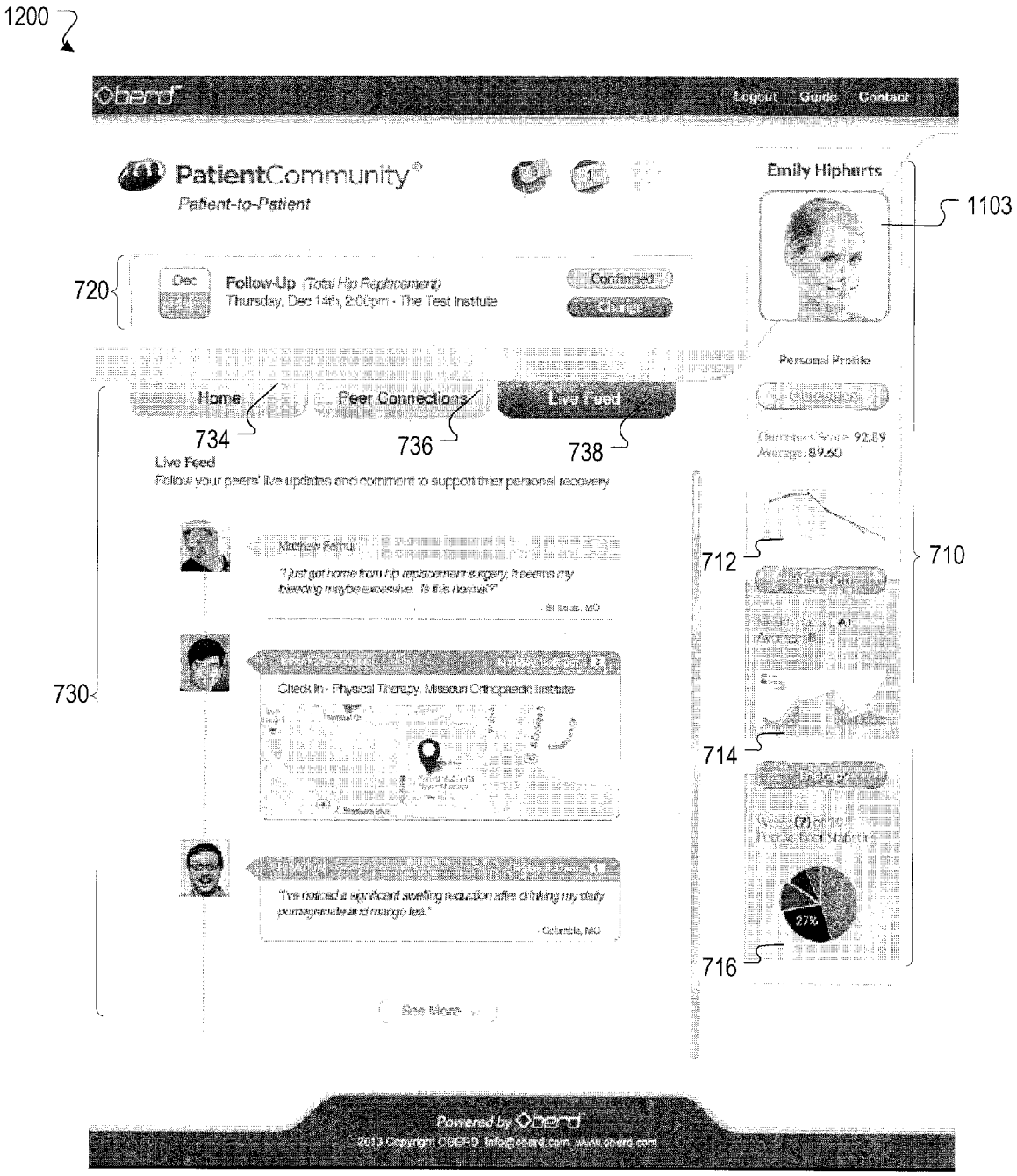

1200
Logout
Guide
Contact
PatientCommunity
Patient-to-Patient
Emily Hiphurts
1103
720
Dec
Follow-Up (Total Hip Replacement)
Thursday, Dec 14th, 2:00pm - The Test Institute
Confirmed
Personal Profile
Home
Peer Connections
Live Feed
734
736
738
Live Feed
Follow your peers' live updates and comment to support thier personal recovery
730
712
710
714
716
Check In - Physical Therapy: Missouri Orthopedic Institute
See More
Powered by OBERD

FIG. 12

1310
Carrier
10:45 PM
Home
PatientCommunity
212
214
Find Care
Login
1300

FIG. 13

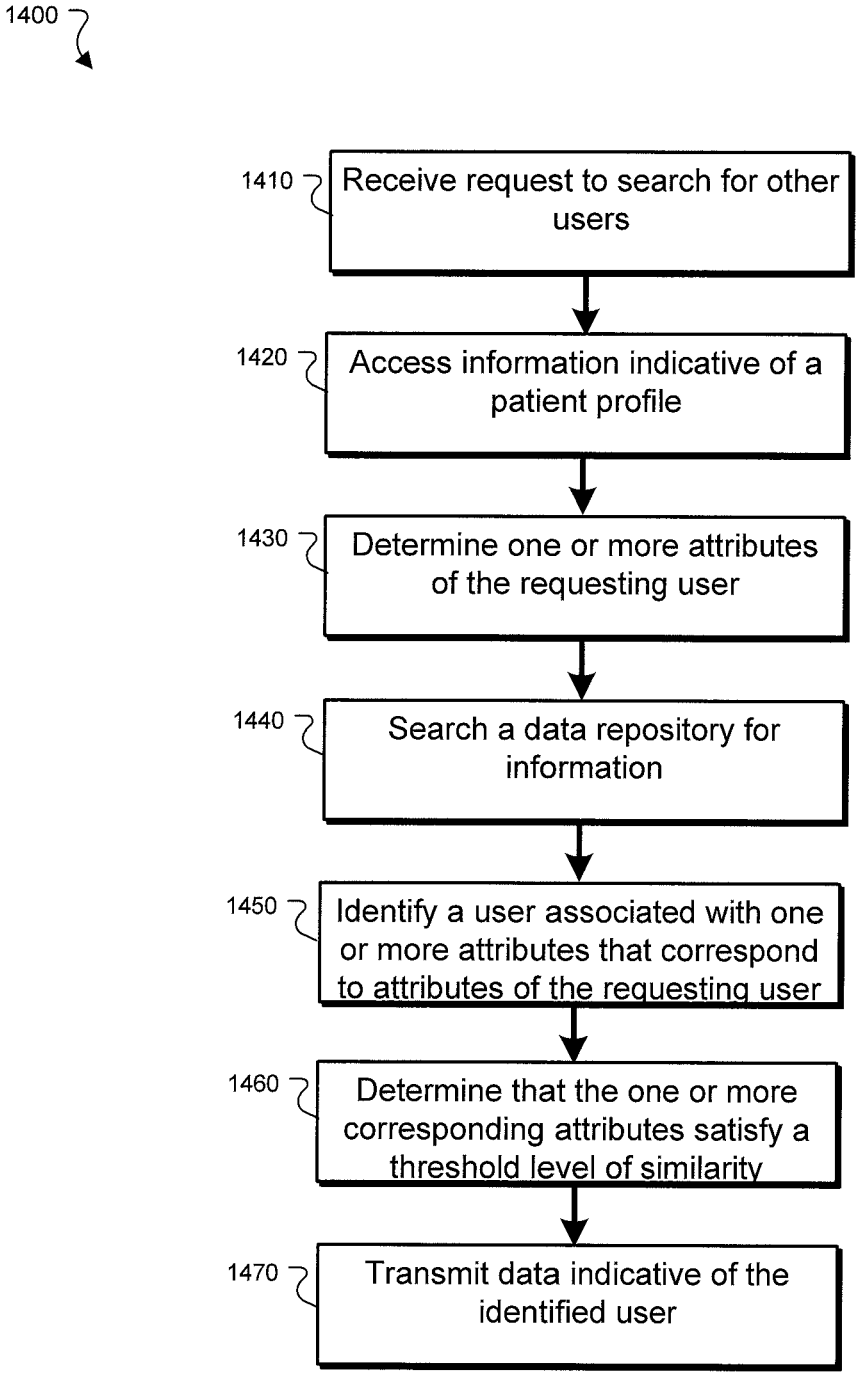

1400
1410
Receive request to search for other users
1420
Access information indicative of a patient profile
1430
Determine one or more attributes of the requesting user
1440
Search a data repository for information
1450
Identify a user associated with one or more attributes that correspond to attributes of the requesting user
1460
Determine that the one or more corresponding attributes satisfy a threshold level of similarity
1470
Transmit data indicative of the identified user

FIG. 14

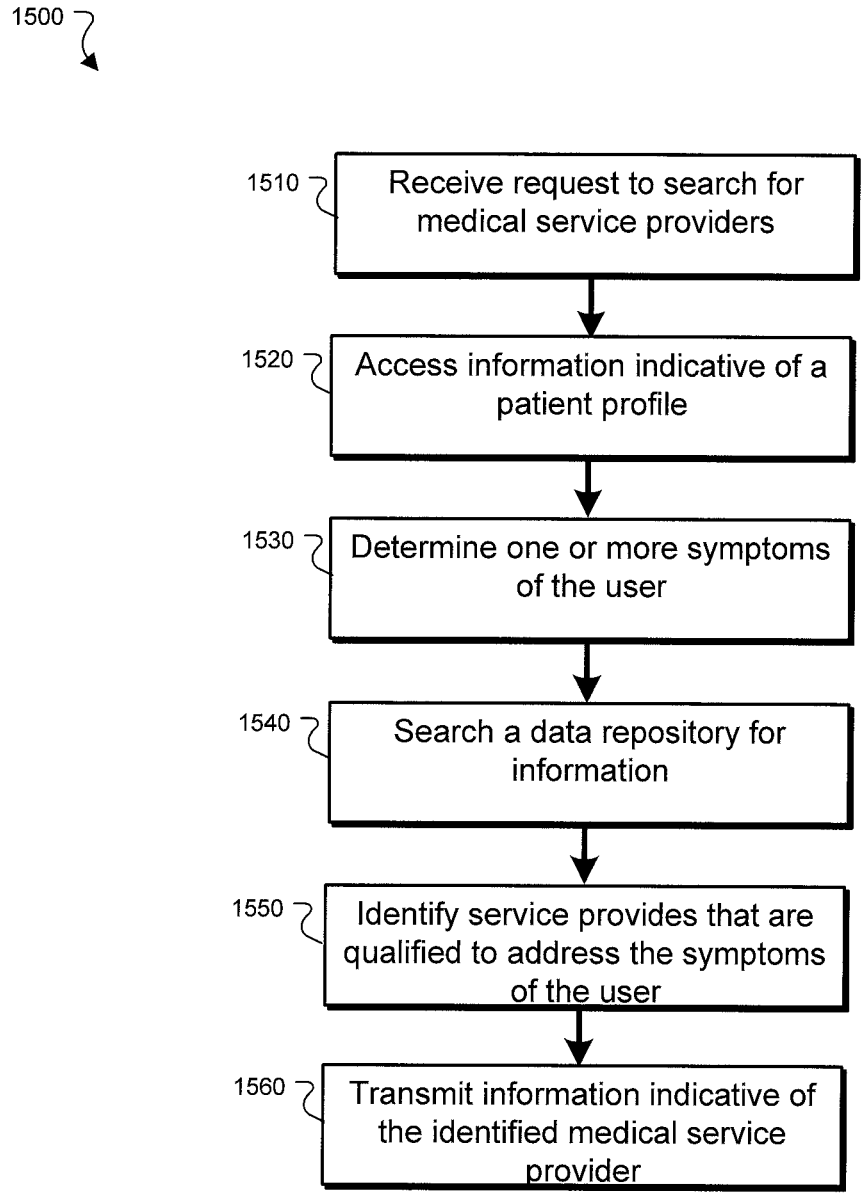

1500
1510
Receive request to search for medical service providers
1520
Access information indicative of a patient profile
1530
Determine one or more symptoms of the user
1540
Search a data repository for information
1550
Identify service provides that are qualified to address the symptoms of the user
1560
Transmit information indicative of the identified medical service provider

FIG. 15

PATIENT-TO-PATIENT COMMUNITIES

BACKGROUND

Social networks and other on-line communities provide different outlets for users of the respective social networks to interact and provide information about what is happening in the life of particular users of the respective social networks.

SUMMARY

In general, an online patient community system is described. A online patient community allows users whom either are contemplating a medical procedure or have already undergone a medical procedure to locate other users that are similarly situated. In an example, a user that has undergone a hip-replacement surgery can locate other users that have undergone the same surgery. The online patient community system also allows users to track their recovery and the recovery of other users. In an example, the online patient community system may allow users to keep a recovery log of their day-to-day progress, which can be shared with other users that are also recovering from similar procedures. Users of the online patient community system can also compare their progress either pre- or post-procedure with the progress of others. In an example, this can include, among other things, a particular user of the online patient community system viewing logs of other users that are progressing more favorably than the particular user so that the particular user may choose to alter their regimen.

In one aspect of the present disclosure, a computer-implemented method include receiving, by a processing device and from a client device associated with a requesting user of an online patient community, a request to search for other users who are associated with at least a threshold level of similarity to the requesting user; accessing information indicative of a patient profile of the requesting user; determining, based on contents of the patient profile, one or more attributes of the requesting user; searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and transmitting, to the client device, information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user.

Implementations of the disclosure may include one or more of the following features. In some implementations, the method includes receiving, from the client device, a request to connect the identified user to the requesting user in the online patient community. In other implementations, the method includes receiving, from the client device, information indicative of one or more attributes of the requesting user; and updating the patient profile of the requesting user with the information indicative of the one or more attributes. In still other implementations, the method includes accessing a medical data record of the requesting user; parsing the medical data record; determining, based on parsing, information indicative of one or more attributes of the requesting user; and updating the patient profile of the requesting user with the information indicative of the one or more attributes. In yet other implementations, the method includes receiving, from the client device, information indicative of recovery information of the requesting user; and sharing the received recovery information with peers of the requesting user in the online patient community; wherein the shared recovery information increases a speed of recovery of at least one of the peers of the requesting user, relative to other speeds of recovery that result from other shared information. In still other implementations, the method includes receiving, from the client device, information indicative of one or more of medical information of the requesting user; and sharing the received medical information with peers of the requesting user in the online patient community.

In other implementations, a computer-implemented method includes receiving, by a processing device and from a client device associated with a user of an online patient community, a request to search medical service providers; accessing information indicative of a patient profile of the user; determining, based on contents of the patient profile, one or more symptoms of the user; searching a data repository for information indicative of one or more medical service providers who are qualified to address at least one of the one or more symptoms of the user; identifying, based on searching, a medical service provider who is qualified to address at least one of the one or more symptoms of the user; and transmitting, to the client device, information indicative of the identified medical service provider.

Implementations of the disclosure may include one or more of the following features. In some implementations, the method includes generating data for a graphical user interface that when rendered on display device comprises: a first visual representation of the determined one or more symptoms of the user; a second visual representation of other information included in the patient profile; a control for the user to modify one or more of the determined one or more symptoms and the other information included in the patient profile; an input box for the user to enter information indicative of one or more procedures; wherein searching comprises: searching the data repository for information indicative of one or more medical service providers who are qualified to address at least one of the one or more symptoms of the user and who are qualified to perform at least one of the one or more procedures.

In another aspect of the disclosure, one or more machine readable hardware storage devices store instructions that are executable by one or more processing devices to perform operations comprising receiving, from a client device associated with a requesting user of an online patient community, a request to search for other users who are associated with at least a threshold level of similarity to the requesting user; accessing information indicative of a patient profile of the requesting user; determining, based on contents of the patient profile, one or more attributes of the requesting user; searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and transmitting, to the client device, information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user. This aspect may include one or more of the foregoing features.

In still another aspect of the disclosure, an electronic system includes one or more processing devices and one or more machine readable hardware storage devices store instructions that are executable by the one or more processing devices to perform operations comprising receiving, from a client device associated with a requesting user of an online patient

community, a request to search for other users who are associated with at least a threshold level of similarity to the requesting user; accessing information indicative of a patient profile of the requesting user; determining, based on contents of the patient profile, one or more attributes of the requesting user; searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user; determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and transmitting, to the client device, information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user. This aspect may include one or more of the foregoing features.

All or part of the foregoing may be implemented as a computer program product including instructions that are stored on one or more non-transitory machine-readable storage media, and that are executable on one or more processing devices. All or part of the foregoing may be implemented as an apparatus, method, or electronic system that may include one or more processing devices and memory to store executable instructions to implement the stated functions.

The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features, objects, and advantages will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE FIGURES

FIG. **1** is a block diagram of components of an online patient community system.

FIGS. **2-12** are screen images of graphical user interfaces generated by an application that can be used to interface with the online patient community system.

FIG. **13** shows a hand held device executing an application that generates the graphical user interfaces that can be used to interface with the online patient community system.

FIG. **14** is a flow chart is a flow chart of an example process that can be used to identify one or more peers to a requesting user of the online patient community system.

FIG. **15** is a flow chart of an example process that can be used to determine a medical service provide that can treat one or more medical symptoms of a requesting user.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

In general, an online patient community system is described in this specification. A user of the online patient community can use the user's profile to build a network of other users, e.g., users with similar profiles. The user can also use the user's profile to search for medical service providers who are qualified to address various medical issues of the consumers.

In an example, an online patient community allows users whom either are contemplating a medical procedure or have already undergone a medical procedure to locate other users that are similarly situated. In an example, a user that has undergone a hip-replacement surgery can locate other users that have undergone the same surgery. The online patient community system also allows users to track their recovery and the recovery of other users. In an example, the online patient community system may allow users to keep a recovery log of their day-to-day progress, which can be shared with other users that are also recovering from similar procedures. Users of the online patient community system can also compare their progress either pre- or post-procedure with the progress of others. This can allow, among other things, a particular user of the online patient community system to view logs of other users that are progressing more favorably than the particular user so that the particular user may choose to alter their regimen.

In general, FIGS. **1-15** are described in relation to the collection and use of certain personal medical information of one or more users. The processes and procedures used by the online patient community system described herein for the collection and use of the personal medical information are compliant with the Health Insurance Portability and Accountability Act (HIPPA) and any other relevant regulations for the protection of personal medical information and other information. In addition, in some implementations, aspects of some or all of the information that is collected by the online patient community system can be anonymized to add additional privacy protections for the users of the online patient community system.

FIG. **1** is a block diagram of components of an online patient community system **100**. In FIG. **1**, client devices **102**, **108** can be any sort of computing devices capable of taking input from a user and communicating over network **110** with server **112** and/or with other client devices. For example, client devices **102**, **108** can be mobile devices, desktop computers, laptops, cell phones, personal digital assistants ("PDAs"), servers, embedded computing systems, and so forth.

In an example, the client devices **102** and **108** are configured to present one or more graphical users interfaces to their respective users. In a particular example, the client devices **102** and **108** have been installed with an application or other executable code. The application or executable code can cause presentation of the graphical user interfaces when the application or executable code is executed, e.g., by a processing device **148**. These graphical user interfaces allow users to enter information and interact with other users of the online patient community system **100**. Particular examples of graphical user interfaces are described in more detail below.

Server **112** can be any of a variety of computing devices capable of receiving data, such as a server, a distributed computing system, a desktop computer, a laptop, a cell phone, a rack-mounted server, and so forth. Server **112** may be a single server or a group of servers that are at a same location or at different locations.

In general, the server **112** can serve as platform for the online patient community system whereby users can connect with each other and share information related to their recovery status. In an example, each of the client devices **102** and **108** can communicate with the server **112** and provide data indicative of a recovery log or other status updates to the server **112**.

The illustrated server **112** can receive data from client devices **102**, **108** via input/output ("I/O") interface **140**. I/O interface **140** can be any type of interface capable of receiving data over a network, such as an Ethernet interface, a wireless networking interface, a fiber-optic networking interface, a modem, and so forth. Server **112** also includes a processing device **148** and memory **144**. A bus system **146**, including, for example, a data bus and a motherboard, can be used to establish and to control data communication between the components of server **112**.

The illustrated processing device **148** may include one or more microprocessors. Generally, processing device **148** may

include any appropriate processor and/or logic that is capable of receiving and storing data, and of communicating over a network (not shown). Memory **144** can include a hard drive and a random access memory storage device, such as a dynamic random access memory, or other types of non-transitory machine-readable storage devices. Memory **144** stores computer programs (not shown) that are executable by processing device **148** to perform the techniques described herein.

In an example, server **112** generates and implements the online patient community, e.g., a social networking platform that enables individual users to establish social connections with other users of the social networking platform. The social connections formed between individual users within a social networking platform may be represented in the form of a graph, where users are represented by nodes and social connections between users are represented by edges connecting the nodes. These social connections between users may reflect relationships between the underlying human users who correspond to the users. For example, a social connection between two user identities within the online patient community may reflect a social friendship (e.g., developed through physical interaction in the real-world and/or through on-line interaction in the cyber-world) or a professional relationship between the underlying human users who correspond to the user identities. This social friendship may be based on the two users having similar medical issues, similar prescribed therapies, being interested in similar medical topics, and so forth.

In an example, a user of the online patient community may be able to unilaterally form a social connection with another user of the online patient community, e.g., based on the two users having a same or a similar medical condition. In this example, the online patient community may enable a first user to form a connection to a second user by specifying a desire to form a social connection to the second user and without requiring approval of the connection by the second user. In another example, the formation of social connections between two user may be a bilateral process. In this example, when a first user specifies a desire to form a connection to a second user identity, the online patient community may establish the connection only after the second user approves the formation of the connection between the first user and the second user.

A user of the online patient community may form an online patient community within the social networking platform by forming social connections to other users of the social networking platform. In some cases, the online patient community of a particular user of a social networking platform may be defined as the group of other users to whom the particular user identity is directly connected. Alternatively, in other cases, the online patient community of a particular user of a social networking platform may be defined to include a group of other users that are within a threshold number of degrees of separation of the particular user. In an example, a graph or other data structure may be maintained by the social networking platform to describe the degrees of separation between a particular users and other users.

Referring now to FIGS. **2-12**, server **112** can generate information for one or more graphical user interfaces that provide information to a user of the online patient community system **100** (FIG. **1**). In general, this information can be indicative of various things to aid the user in making informed decisions with respect to their respective medical care. In an example, the information can be indicative of a profile of one or more users of the online patient community system **100** who have undergone a similar procedure. In another example, the information can be indicative of physicians or other service providers that perform the particular procedure. In yet another example, the information can be indicative of a recovery log for a particular user of the online patient community system **100**.

In general the graphical user interfaces can be rendered by an application installed on a client device **102** or **108** (FIG. **1**) as part of execution of the application. In an example, the graphical user interfaces can be rendered by an application that when executed generates the graphical user by loading graphical resources stored on the client device **102** or **108** and installed as part of the installation of the application. In another example, the graphical user interfaces can be generated by a browser-based application that generates that graphical user interfaces by receiving and interpreting information indicative of one or more web pages provided by the online patient community system **100**.

Referring now to FIG. **2**, a screen image of a graphical user interface **200** is shown that may be presented as a home screen or other initial landing screen. In an example, the graphical user interface **200** can be presented when a user first executes an application that can interface with the online patient community system **100** (FIG. **1**). In another example, the graphical user interface **200** can be presented when a user navigates to a web page that is provided by the online patient community system **100** (FIG. **1**) using a browser-based application.

In a particular example, the graphical user interface **200** includes a quick search region **210**, a patient-to-patient region **220**, and a patient-to-doctor region **230**. The particular example of the graphical user interface **200** also includes "find care" user interface control **212** and a "login" user interface control **214**.

The quick search region **210** allows a user to enter certain search criteria related to doctors, locations, and specialties into respective fields of the quick search region **210** to identify medical service providers that match the provide search criteria. A user need not enter information into all fields of the quick search region **210** to obtain search results. In an example, a user can search for doctors by last name only without providing a location or a specialty in the quick search region **210**. As a result of providing the search criteria, the online patient community system **100** (FIG. **1**) can perform a search to locate one or more medical service providers, such as doctors, hospitals, physical therapists, and other medical service provides that are response to the search request.

The patient-to-patient region **220** presents useful information about the online patient community system **100** (FIG. **1**) to a user. This may entice or otherwise convince a user to register with the online patient community system **100**. In a particular example, the user may register with the online patient community system **100** using he "login" user interface control **214**.

In some implementations, when a user selects the "login" user interface control **214**, the application may generate another graphical user interface that allows the user to login into the online patient community system using various login credentials. An example of a graphical user interface that can be used for this purpose is described in more detail in reference to FIG. **6**.

The doctor-to-patient region **230** presents useful information to users who are searching for medical service providers. In addition, the doctor-to-patient region **230** presents user interface controls **231**, **232**, and **233** that when selected perform a particular targeted search. In an example, if a user selects the user interface control **231**, the user can perform a search to find a specific doctor. In another example, if a user

selects the user interface control **232**, the user can perform a search to find a specific location in which to have a medical procedure performed.

In some implementations, when a user selects the "find care" user interface control **212**, the application may generate another graphical user interface that allows the user to search for search for medical care by providing one or more pieces of information.

FIGS. **3-5** are now described. In general, FIGS. **3-5** show screen images of graphical user interfaces for an application in communication with the online patient community system **100** (FIG. **1**). In a particular example, the graphical user interfaces shown in FIGS. **3-5** illustrate aspects of the online patient community system that pertain the features of the online patient community system **100** that relate to patient-to-doctor searching and communication.

Referring now to FIG. **3**, a screen image of a graphical user interface **300** is shown that may be presented to a user allowing the user to perform one or more searches for service providers. The graphical interface **300** includes the quick search region **210**, a search activity indicator **305**, and a second search region **310**.

The search activity indicator **305** can provide one or more user interface elements with respect to a particular user's search activity. The search activity indicator **305** is shown in multiple of the graphical interfaces **300**, **400**, and **500**. In some implementations, when a user selects one of the user interface elements, a respective graphical user interface changes so that a selected activity is presented in a different graphical user interface. Additional examples of the search activity indicator are described in more detail elsewhere in this specification.

The second search region **310** allows the user to perform a more refined search that the quick search region **210** by allowing the user to provide additional information for a particular kind of search to find information for which the user is searching. In the depicted example, the second search region **310** allows a user to search for service providers based on profile information that is stored by the online patient community system **100** (FIG. **1**). Examples of providing profile information are described in more detail elsewhere in this specification. In some implementations, the search region **310** may allow for other kinds of searching, such as searching by doctor, searching by location, searching by specialty, and so forth. In general, second search region **310** is populated with various user input controls based on the type of search to be performed.

In an example, because the second search region **310** is being used to search by profile, one or more user input controls **312-320** can be presented to relate to profile information that pertains to one or more users of the online patient community system **100** (FIG. **1**). In general, a user can provide input into one or more of the user input controls **312-320** to search the profiles of the users of the online patient community system **100** according to the search criteria provided by the user.

In a particular example, the user input control **314** can be used to search users of the online patient community system **100** based on the respective ages of the users of the online patient community system **100**. In other particular examples, a user can provide an outcome rating range into the user input control **316**, symptoms into the user input control **318**, and procedures into the user input control **320**. These and other aspects of profile information stored in the online patient community system **100** are described elsewhere in this specification.

In an example, controls in second search region **310** can be automatically populated with values that are included in a user profile. In this example, server **112**, accesses information indicative of a patient profile of the user. Server **112** determining, based on contents of the user profile, one or more symptoms of the user. In this example, server **112** pre-populates user input control **318** with the determined one or more symptoms of the user. In this example, a user profile is being used to drive identification of a medical service provider who is qualified to address at least one of the one or more symptoms of the user. In this example, user input control **318** includes a visual representation of the determined one or more symptoms.

Referring now to FIG. **4**, a screen image of a graphical user interface **400** is shown that can be used to provide search results. In a particular example, the graphical user interface **400** provides search results according to a search conducted by a user to identify one or more doctors. A similar interface may also be provided when the search is for other users in the online patient community system **100** (FIG. **1**) or other searches such as location searches, specialty searches, and so forth.

In general, the graphical user interface **400** includes the quick search region **210**, the search activity indicator **305**, and a detailed search results region **410**. In the depicted example, the search activity indicator **305** includes user interface elements **305***a* and **305***b*. The user interface element **305***b* represents the current search activity of providing search results. If, for example, a user were to select user interface element **305***a*, the graphical user interface **400** would change so that a user could provide search criteria, similar to the manner in which a user can provide search criteria using graphical user interface **300**.

In general, the detailed search results region **410** can be organized in a table-like fashion to provide information about one or more doctors, where the information is responsive to a search request or other request for information. In a particular example, the detailed search results region **410** includes one or more rows **412***a*-**412***e* and one or more columns, **414***a*-**414***d*.

Each of the rows **412***a*-**412***e* provides information about each of the particular doctors whose information matched or was otherwise responsive to a particular search request or other request for information. Column **414***a* presents personal information about a particular doctor in each of the respective rows **412***a*-**412***e*. In an example, the column **414***a* can present a picture of the doctor, their name, and any of their specialties. In a particular example, column **414***a* for row **412***a* indicates that the doctor's name is "Dr. Matthew J. Smith, MD" with specialties in orthopedic surgery and shoulder and elbow surgery.

Column **414***b* shows a graphical representation of the doctor's outcomes rating. In an example, this can be shown as an overall rating, as a trend, and combinations of these. In addition, in an example, the outcomes rating may be shown for pre-op care, surgical care, and follow-up care. In a particular example, column **414***b* for row **412** indicates that the doctor's overall outcome rating is 89.9. The outcomes ratings are described in more detail elsewhere in this specification.

Column **414***c* provides additional user-selectable elements that can be viewed to provide additional information about a particular doctor. In an example, the column **414***c* can provide links to patient reviews and recommendations. That is, if a user selects a link corresponding to either the patient reviews or the recommendations, the graphical user interface **400** may change to present the selected reviews or recommendations. In addition, the user-selectable elements may include a num-

ber that indicates a number of patient reviews or recommendations. In a particular example, column **414***c* indicates for row **412***a* that there are 18 patient reviews and 23 recommendations.

Column **414***d* provides location information about particular doctors. In some implementations, the location information is the particular hospital or clinic where the doctor practices. In other implementations, the location information is a particular group in which the doctor belongs. In these and other implementation, there may be multiple locations in which the doctor practices. In a particular example, were a particular doctor is affiliated with multiple locations, a user interface control **416** can be presented that when selected presents the other locations to the user.

In some implementations, one or more portions of the rows **412***a*-**412***e* and the columns **414***a*-**414***d* are user selectable. In response, the graphical user interface **400** may change to present additional information that corresponds to the selection. In a particular example, if a user selects a representation in column **414***a*, the user interface **400** may change to provide more detailed information about the selected doctor.

In some implementations, the graphical user interface **300** can be a front-end to a process for performing a search. In a particular example, the graphical user interface **300** can be a front-end to a process described in reference to FIG. **15**, e.g., when the user selects the "Search" user input control **322**.

Referring now to FIG. **5**, a screen image of a graphical user interface **500** is shown that can be used to present additional information about a selected doctor. In some implementations, the graphical user interface **500** can be shown when a user selects elements of the detailed search region **410** (FIG. **4**), such as particular columns **414***a*-**414***d* in any of the rows **412***a*-**412***e*. In general, the graphical user interface includes the quick search region **210**, the search activity indicator **305**, and a doctor information region **510**.

In the depicted example, the search activity indicator **305** includes user interface elements **305***a*, **305***b*, and **305***c*. The user interface element **305***c* represents the current search activity of providing additional information about the selected doctor. If, for example, a user were to select the user interface element **305***a*, the graphical user interface **500** would change so that a user could provide search criteria, similar to the manner in which a user can provide search criteria using graphical user interface **300**.

Similarly, if the user where to select the use interface element **305***b*, the graphical user interface **500** would change so that a user could review particular search results, similar to the manner in which the user can review search results using graphical user interface **400**.

The doctor information region **510** includes information about the selected doctor. In a particular example, the doctor information region **510** can include a picture of the doctor, a description of the doctor's particular specialties, a satisfaction rating indicator **512**, an outcome rating indicator **514**, a map region **516**, and one or more additional components **518**-**524** that can be selected to provide additional information about the doctor.

The satisfaction ratings indicator **512** can show how particular patients have rated the particular doctor. In a particular example, the satisfaction rating indicator **512** is a graph or chart this includes positive ratings, negative ratings, and neutral ratings. In addition, these positive ratings, negative ratings, and neutral ratings can be used by the online patient community system **100** (FIG. **1**) to compute an over satisfaction rating for the particular doctor. Various techniques can be used by the online patient community system **100** to determine the overall rating of the doctor, including computing an average rating based on one or more rating scores provided by users of the online patient community system **100**.

The outcome ratings indicator **514** may be similar to the information presented in column **414***b* of the detailed search results region **410** (FIG. **4**). In some implementations, the outcome ratings indicator **514**, however, may be enlarged or include additional information not able to be presented in the detailed search results region **410**. In the depicted example, the outcome ratings indicator **514** presents an average outcome rating. In general, an outcome rating is based on some amount of information provided by a physician about an expected outcome and determining whether the actual outcome was in-line with the expectations. In an example, the outcome rating is based on a collection of patient outcome-based data. Generally, patient outcome-based data includes data collected by the online patient community system **100** (FIG. **1**) to evaluate the capacity of a medical procedure and/or process to function at a pre-defined level. In a particular example, if a procedure has average recovery of 8 weeks, the outcome rating can be based on a number of patients that are treated by the particular doctor that recover more quickly than average, recovery less quickly than average, and recover on average with the pre-defined recover level.

In some implementations, the outcome ratings can be subdivided into pre-op expectation ratings **514***a*, surgical expectation ratings **514***b*, and follow-up expectation ratings **514***c*. In an example, the outcome rating can be based different ratings for each of pre-op expectation ratings **514***a*, surgical expectation ratings **514***b*, and the follow-up expectation ratings **514***c*.

The map region **516** can present a location of doctor in a surrounding area. In some implementations, the map region **516** can be zoomed-in or zoomed-out to provide addition views of the location and surrounding area. The one or more additional components **518**-**524** that can be selected by user based on the wanting to view other information about the doctor. As an example, the user can select the additional component **518** to view more information about the doctor's education and background based on information that is stored on the online patient community system **100** (FIG. **1**).

FIGS. **6**-**12** are now described. In general, FIGS. **6**-**12** show screen images of graphical user interfaces for an application in communication with the online patient community system **100** (FIG. **1**). In a particular example, the graphical user interfaces shown in FIGS. **6**-**12** illustrate aspects of the online patient community system that pertain the features of the online patient community system **100** that relate to patient-to-patient searching, communication, and other patient-to-patient community-based features.

Referring now to FIG. **6**, a screen image of a graphical user interface **600** is shown that can be used as a login page, landing page, or other home page for a patient-to-patient community hosted by the online patient community system **100** (FIG. **1**). In general, the graphical user interface **600** includes a user credential region **610** that allows a user to provide at least a username and password. The online patient community system **100** can verify the provided username and password to grant access to the patient-to-patient community hosted by the online patient community system **100**.

Referring now to FIG. **7**, a screen image of a graphical user interface **700** is shown that can be used as a welcome page and/or profile page for a particular user of the patient-to-patient community host by the online patient community system **100** (FIG. **1**). In an example, the graphical user interface **700** can be presented to a user once the online patient community system **100** has verified the username and password provided the user in the user credential region **610** (FIG.

6). In general, the graphical user interface **100** provides one or more graphical user components that allow a user to manage their patient profile on the online patient community system **100**, track their recovery progress relative to other users of the online patient community system **100**, and search for other user of the online patient community system **100** based on similar procedures performed or other search criteria, to name few examples. In a particular example, the graphical user interface **700** includes a profile region **710**, an appointment region **720**, and an information region **730**.

The profile region **710** includes graphical representations indicative of certain information about a particular user's recovery or general health. In a particular example, the profile region **710** includes a picture of the user, an outcome score region **712**, a nutrition region **714**, and a therapy region **714**. In general, the graphical representatives in the profile region **710** are indicative of different aspects of the user's recovery that are determined from information that the particular user enters into a recovery log or other aspect of the particular user's profile. Entering information about aspects of the particular user's profile is described in more detail elsewhere in this specification.

In general, the outcome score region **712** includes an outcome score for one or more procedures that the particular user has undergone. In some implementations, the outcome score region **710** may be subdivided into a pre-op outcome score region, a surgery outcome score region, and a follow-up outcome score region, similar to the subdivisions described in reference to FIG. **5**. In an example, the outcome score presented in the outcome score region **712** for the particular user can be based on their respective progress relative to all other users of the online patient community system **100** that have undergone a similar procedure. In another example, the outcome score presented in the outcome score region **712** for the particular user can be based on their respective progress relative to only those users of the online patient community system **100** to which the users are acquainted or otherwise connected, e.g., through a friending processes or other similar process that is supported by social networks in general. A particular example of connecting with other users of the online patient community system **100** is described in more detail elsewhere in this specification.

In general, the nutrition and health region **714** includes an indication of the particular user's health rating. In some implementations, the health rating can be based on nutrition information that is entered by the user and compared with a nutritional database and/or compared to one or more users of the online patient community system **100** (FIG. **1**). In an example, the health rating presented in the nutrition and health region **714** for the particular user can be based on their respective health and nutrition information relative to all other users of the online patient community system **100** that have undergone a similar procedure. In another example, the health rating presented in the nutrition and health region **714** for the particular user can be based on their respective health and nutrition information relative to only those users of the online patient community system **100** to which the users are acquainted or otherwise connected, e.g., through a friending processes or other similar process that is supported by social networks in general.

In general, the therapy region **716** includes an indication of the particular user's progress in a therapy regimen. In general, the indication can be based on the particular user's current timetable with respect to their medical procedure. In an example, the therapy regimen may be a pre-operative regimen. In another example, the therapy regimen may be a post-operative regimen. In some implementations, the indication in the therapy region **716** can be based on a calendar other appointment schedule that a user of the online patient community system **100** (FIG. **1**) can provide physical therapy appointments. In a particular example, the therapy region **716** indicates that the particular user of the online patient community system **100** is on their seventh week of a ten-week therapy regimen. In some implementations, the therapy region **716** also provides a user interface component that allows a particular user to track or otherwise compare their respective therapy progress relative to other users of the online patient community system **100**. In an example, therapy comparison for the particular user can be based on their respective progress relative to all other users of the online patient community system **100** that have undergone a similar procedure and/or therapy regimen. In another example, the comparison for the particular user can be based on their respective progress relative to only those users of the online patient community system **100** to which the users are acquainted or otherwise connected, e.g., through a friending processes or other similar process that is supported by social networks in general.

In general, the appointment region **720**, can allow a particular user to track important or other relevant appointments relative to a user's medical care. In general, the appointment region **720** may be populated with information that is collect from the user or on behalf of the user. In an example, the appointment region **720** may be populated by referencing medical information stored on a computer at a hospital or other location in which the online patient community system **100** can communicate. In another example, the appointment region **720** may be populated with information that is entered by the particular user, e.g., in a recovery log or other aspects of the particular user's profile. In some implementations, the appointment region **720** allows a user to confirm or change a particular scheduled appointment using various user interface components.

In general, the information region **730** presents information to the particular user that is indicative of various aspects of their user profile. In addition, the information region **730** may provide one or more user interface components that allows a particular user to enter information that pertains to the particular user's recovery.

In an example, the information region **730** includes a profile edit button **732** and one or more selectable user interface tabs **734**, **736**, and **738**. In general, the profile edit button **732** allows the particular user to make changes to their respective profile information. In general, the one or more selectable user interface tabs **734**, **736**, and **738** that allow a user to present different information in the information region **730** and perform various activities that edit or otherwise affect the contents of the user's profile. Editing profile information and performing a number of other activities are described elsewhere in this specification.

Referring now to FIG. **8**, a screen image of a graphical user interface **800** is shown that can be used to edit profile information for a particular user of the online patient community system **100** (FIG. **1**). In an example, the graphical user interface **800** can be shown when a user selects the profile edit button **732** shown in FIG. **7**. In an example, the information region **730** can present multiple user interface elements that allow a user to modify and update his/her profile information. In a particular example, the information region **730** can present user interface components that allow the particular user to change his/her name, certain demographic information, such as date of birth, gender, location, and so forth, and certain relevant health information, such as exercise status, smoking status, and so forth. In another example, the infor-

mation region **730** can also present a user interface component that allows a user to add a photo, save changes, or search for similar users (e.g., peers) on the online patient community system **100** (FIG. **1**). In an example, server **112** receives, from a client device of a user who is updating a user profile, information indicative of one or more attributes of the user. In the example of FIG. **8**, these attributes includes attributes **802***a*-**802***k*. In this example, server **112** updates the patient profile of the requesting user with the information indicative of the one or more attributes **802***a*-**802***k*.

In general, the graphical user interface **800** can be used to build a user profile that pertains to a recovery from a medical procedure. In some implementations, other users of the online patient community system **100** (FIG. **1**) can use the information that is provided on a particular user's profile to track the progress of the particular user and to see what actions the particular user has taken to achieve a better outcome, e.g., based on a determined outcome score. In some situations, the ability to track another user's progress of the online patient community system may prompt other users to bring to their respective physicians' attention actions that the particular user performed to determine whether those actions may yield a better outcome.

Referring now to FIG. **9**, a screen image of a graphical user interface **900** is shown that can be used to by a particular user to provide information about their respective recovery. In general, the graphical user interface **900** can be shown in response to a user selecting the "Home" user interface tab **734**. In an example, the user may add or modify their recovery log. As another example, the user may write a review or otherwise rate their physician or others involved in providing medical care to the particular user

The graphical user interface **900** includes an edit region **910** that allows a user to make changes to their recovery log. In an example, the edit region **910** can include one or more user interface tabs **912**, **914**, and **916** that allow a user to edit their recovery log with respect to procedure outcomes, nutrition, and therapy, respectively.

In this example, information in the outcomes tab **912** may be shared with other users who share a social connection to user **1103** in the online patient community. Generally, outcome information includes information indicative of an outcome (e.g., a result) of a pre-operative condition, an operative procedure and/or a post-operative procedure. Through sharing of the outcome information, other users that are connected to user **1103** may read and review the outcome experiences of user **1103**. These other users may be similar users to user **1103**, e.g., by having similar medical operations and conditions.

In this example, information in the nutrition tab **914** may be shared with other users who share a social connection to user **1103** in the online patient community. Generally, nutrition information includes information indicative of dietary goals and nutrition supplements and other nutrition information of a user. Through sharing of the nutrition information, other users that are connected to user **1103** may read and review the nutrition information of user **1103**. These other users may be similar users to user **1103**, e.g., by having similar medical operations and conditions. By viewing the nutrition information of user **1103**, the other users may ascertain effective nutrition for a medical condition of the other users that is also experienced by user **1103**.

In this example, information in the therapy tab **916** may be shared with other users who share a social connection to user **1103** in the online patient community. Generally, therapy information includes information indicative of therapy goals, exercise and programs of a user. Through sharing of the therapy information, other users that are connected to user **1103** may read and review the therapy information of user **1103**. These other users may be similar users to user **1103**, e.g., by having similar medical operations and conditions. By viewing the therapy information of user **1103**, the other users may ascertain what therapies user **1103** has determined to be effective for a medical condition and whether these therapies may also be effective for the other users.

The edit region **910** also includes graphical user elements that can allow the user to control the manner in which the updated recovery log information is stored by the online patient community system **100** (FIG. **1**) or presented to other users of the online patient community system **100**.

In an example, a use interface component **920** allows user **1103** to save changes to their respective recovery log. In this example, the recovery log may be shared with other users who share a social connection to user **1103** in the online patient community. Through sharing of the recovery log, other users that are connected to user **1103** may read and review the recovery experiences of user **1103**. These other users may be similar users to user **1103**, e.g., by having similar medical operations and conditions. The shared recovery information of user **1103** increases a speed of recovery of at least one of the peers of user **1103**, relative to other speeds of recovery that result from other shared information.

In another example, a user interface component **922** allows a user to post their recovery log information to a live feed. In general, a live feed is real-time feed that shows current user activity with respect to their recovery. In an example, if a particular user is participating in a therapy session, the user can post the appointment to their live feed at the time they begin so that other users can see that the particular user is currently in therapy. Live feed are also described elsewhere in this specification.

Referring now to FIG. **10**, a screen image of a graphical user interface **1000** is shown that can be used to find other users in the online patient community system **100** (FIG. **1**) that share one or more characteristics with the particular user. In general, the graphical user interface can be presented in response to a user selecting the "Peer Connection" user interface tab **736**.

In general, the shared characteristics that be used to search for other users of the online patient community system **100** (FIG. **1**) can be aspects of the one or more user's respective profiles. In an example, users can be matched based on procedures performed, or to be performed, on the respective user, similar age ranges, health ratings, or other information that is associated with or computed from a particular user's profile.

In a particular example, the information region **730** can include one or more user interface components that can list information from the user profile including the name, date of birth, height, weight, medical condition, treating physician, location of the procedure, procedure to be performed, gender, smoking status, exercise status, and other information. In some implementations, the information presented in the information region **730** is automatically populated by referencing medical data maintained by the online patient community system **100** (FIG. **1**). For example, data repository **114** may store a medical data record of user **1103**. Data repository **114** may originally access the medical data record from an external health care system. Server **112** accesses, from data repository **114**, a medical data record of requesting user **1103**. Server **112** parses the medical data record. Server **112** determines determining, based on parsing, values of one or more of attributes **1011***a*-**1011***k* of user **1103**. Server **112** updates and/or pre-populates user profile **1011** with the determined values of attributes **1011***a*-**1011***k*.

In some implementations, the user interface components in the information region **730** can be user-editable, allowing a particular user to enter some or all of the relevant information for which the particular user wishes to base user matches. In some implementations, when a user is satisfied with the profile information presented in the information region **730**, the user can select the search button **1010** indicating that the online patient community system **100** should perform a search to find relevant (e.g., similar) other user of the online patient community system **100**. In this example, server **112** uses the user profile shown in graphical user interface **1000** to search for similar users, e.g., users with a predefined level of similarity to the user associated with the user profile shown in graphical user interface **1000**.

In the example of FIG. **10**, information region **730** includes user profile **1011**. In this example, user profile **1011** includes information indicative of attributes of a user, including, e.g., attributes **1011***a*-**1011***k*. Generally, an attribute includes a characteristic of a user and may include a medical condition of a user and/or a medical treatment of the user. Upon selection of search button **1010**, server **112** searches for other users that are similar to the user associated with profile **1011**. In this example, server **112** searches for these similar users by comparing attributes **1011***a*-**1011***k* in profile **1011** to attributes in other users profiles, e.g., that are stored in data repository **114**. In this example, server **112** identifies a similar user as being a user that is associated with a profile that includes an attribute matching at least one of attributes **1011***a*-**1011***k* in profile **1011**. When server **112** identifies this similar user, server **112** enables the user associated with profile **1011** to become connected to this similar user, e.g., by generates a social connection in the social networking platform of the online patient community between the similar user and the user associated with profile **1011**.

Referring now to FIG. **11**, a screen image of a graphical user interface **1100** is shown that can be used to present search results of other peers, or patients, that have profiles on the online patient community system **100** (FIG. **1**) and that are responsive to search criteria. In general, the search criteria are provided by the user in the one or more user interface components presenting in the information region **730** of the graphical user interface **1000** (FIG. **10**). In addition, in general, the search results may be provided when a user selects the search button **1010** shown in the information region **730** of the graphical user interface **1000**.

In the example of FIG. **11**, information region **730** includes similar user region **1101** that displays information indicative of similar users **1101***a*-**1101***g*. In this example, similar users **1101***a*-**1101***g* are associated with profiles that includes one or more attributes that correspond to (e.g., match) at least one of the attributes of user **1103** who is associated with profile **1011** (FIG. **10**). In this example, server **112** uses the profiles of users of the online patient community in identifying similar users.

Referring back to FIG. **10**, attribute **1011***h* of profile **1011** specifies that user **1101** has had a surgical procedure of a total hip replacement. Referring now to FIG. **11**, similar users **1101***a*-**1101***g* each are associated with an attribute that includes a value of "hip," including, e.g., partial hip replacement, total hip replacement and hip impingement surgery. That is, similar users **1101***a*-**1101***g* are similar to user **1103** because both similar users **1101***a*-**1101***g* and user **1103** have had medical treatments and/or operations pertaining to the hip. Accordingly, server **112** determines that user **1103** may be interested in tracking treatments and recovery of one or more of similar users **1101***a*-**1101***g*.

In this example, similar user region **1101** includes invitation controls **1105***a*-**1105***g*. Each of invitation controls **1105***a*-**1105***g* are selectable, e.g., to specify that user **1103** wants to invite one or more of similar users **1101***a*-**1101***g* to be connected to user **1103** in the online patient community. In this example, user **1103** selects invitation controls **1105***a*, **1105***b* to invite similar users **1101***a*, **1101***b* to become connected with user **1103** in the online patient community. Graphical user interface **1100** includes control **1102**, selection of which invites selected similar users (e.g., similar users **1101***a*, **1101***b*) to become connected to user **1103** in the online patient community. In this example, server **112** invites selected similar users (e.g., similar users **1101***a*, **1101***b*) to become connected to user **1103** in the online patient community by transmitting to client devices used by the selected similar users an email message or text message or other notification message that notifies the selected similar users that user **1103** would like to form a connection in the online patient community. In this example, the notification message includes a selectable link that a similar user can select to send to server **112** a message indicating that the similar user accepts the request to form the connection to user **1103** in the online patient community.

Referring now to FIG. **12**, a screen image of a graphical user interface **1200** is shown that can be used to present a live feed. In general, the live-feed can be presented in response to a user selecting the "Live Feed" user interface tab **738**. The live feed can provide real-time and pseudo-real-time updates to the particular user that pertain to other users (e.g., similar users) that the particular user is connected to vis-à-vis the online patient community system **100** (FIG. **1**). In general, these updates pertain to medical progress of the respective similar users, e.g., to promote user **1103** in learning from treatments and recovery methods of similarly situated users. In an example, a first user can post a question to the live feed about their recovery and have that question answered by other users that are connected to the first user. As another example, a second user can post an update to the live feed about nutritional supplement that has a positive effect on their recovery.

Thus, users of the online patient community system **100** (FIG. **1**) can use the live feed to get real-time and pseudo-real-time updates about other users' recoveries and make more informed decisions about actions that the particular users can take to improve the outcomes of their respective procedures. In an example, a particular user can see improvements to multiple other users' outcomes based on a particular nutritional supplement or therapeutic regimen. If the user believes that these improvements are a function of the supplements or therapeutic regimen, they can choose to take that information to their physician so that the particular user and the physician can determine if that course of action may improve the overall outcome.

In some implementations, the live feed presented in the information region **730** can be color-coded. In an example, a first color can be used to represent an update pertaining to an outcome, a second color can be used to represent an update pertaining to nutritional information, and a third color can be used to represent an update pertaining to a therapy session.

Referring now to FIG. **13**, a screen image of a graphical user interface **1300** is being shown as part of an application loaded on a client device **102** or **108**, such as a handheld device **1310**. In the depicted example, the graphical user interface **1300** is similar to the graphical user interface **200** that provides a landing screen or home screen to a particular application that can be used to communicate with the online patient community system **100** (FIG.). The graphical user interface **1300**, however, may be customized to fit a smaller

screen of the handheld device **1310** relative to other client device **102** or **108**, such as a desktop computer, laptop computer, and so forth.

In addition, if a user selects either of the "find care" user interface control **212** or the "login" user interface control **214**, the application can present additional graphical user interfaces described elsewhere in this specification that satisfy the user selection. In an example, if a user selects the "login" user interface control **214**, the user may be presented with a graphical user interface that is similar to the graphical user interface **600** (FIG. **6**). In some implementations, however, the user interface may also be customized to fit a small screen of the handheld device **1310**.

FIG. **14** is a flow chart of an example process **1400** that can be used to identify one or more peers to a requesting user of the online patient community system **100** (FIG. **1**). Server **112** implements process **1400**. In general, the process **1400** determines a threshold (e.g., a predefined amount_level of similarity between a requesting user and other users of the online patient community system **100**. In some implementations, the threshold level of similarity can be based at least in part on information that is included in the respective user profiles, e.g., that pertains to a medical condition, procedure, or recovery. In general, process **1400** is described in relation to an online patient community system **100** that is configured to perform the process **1400**, although other systems may be configured to perform process **1400**.

In operation, server **112** receives (**1420**) a request to search for other users who are associated with at least a threshold level of similarity to a requesting user. In an example, the online patient community system **100** may receive a request from client devices **102** or **108** that have been installed with an application or program code that can receive user input and transmit that user input in the form of a search request.

Server **112** access (**1420**) information indicative of a patient profile of the requesting user. In an example, profile information stored by the online patient community system **100** (FIG. **1**) can be accessed. In some implementations, this profile information may include recovery log information, nutritional information, therapeutic progress information, and other information that can be used to construct a user profile as described elsewhere in this specification.

Based on contents of the patient profile, server **112** determines (**1430**) one or more attributes of the requesting user. In an example, the requesting user's medical condition or scheduled procedure may be determined from the patient profile.

Server **112** searches (**1440**) a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user. In an example, the online patient community system **100** (FIG. **1**) may maintain a database or other data repository that can be searched for information indicative of a user that has a similar medical condition to that of the requesting user or has undergone or is schedule to undergo the same medical procedure as the requesting user.

Server **112** identifies (**1450**) a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user based on the searching. In an example, users that have a same or similar medical condition to that of the requesting user may be identified. As another example, users that have undergone or are schedule to undergo the same or similar surgery as the requesting user may be identified.

Server **112** determines (**1460**) one or more corresponding attributes of the identified user to satisfy the threshold level of similarity. In some implementations, the threshold level of similarity may be an exact match with respect to one or more of the corresponding attributes. In an example, users that have undergone or are schedule to undergo the same medical procedure satisfy the threshold level of similarity. In other implementations, the threshold level of similarity may be less strict. In an example, users that have undergone or are scheduled to undergo a procedure to the same area of the requesting user's body may satisfy the threshold level of similarity. Other threshold levels of similarity are also possible, and other attributes may be used in the determination. In an example, age and/or gender of the requesting user and other users may be useful in determining a threshold level of similarity

Server **112** transmits (**1470**), e.g., to a client device, information indicative of the identified user. In an example, information (e.g., information for a graphical user interface) can be transmitted to a client device **102** or **108** (FIG. **1**). In some implementations, the information can be presented in one or more of the user interfaces **200**-**1300** described elsewhere in this specification. In some implementations, the transmitted information can specify that the identified user is a peer of the requesting user. In an example, the requesting user may want add the peer to the requesting user's list of peers so that the requesting user may track the recovery progress of the peer to improve the requesting user's own recovery.

FIG. **15** is a flow chart of an example process **1500** that can be used to determine a medical service provide that can treat one or more medical symptoms of a requesting user. In an example, server **112** implements process **1500**. In general, the process **1500** uses symptoms of the requesting user of an online patient community system **100** (FIG. **1**) to identify a qualified service provider that can treat the requesting user's symptoms **100**. In general, process **1500** is described in relation to the online patient community system **100** that is configured to perform the process **1500**, although other systems may be configured to perform process **1500**.

In operation, server **112** receives (**1510**) a request to search medical service providers. In some implementations, the request can be received online patient community from a client device **102** or **108** (FIG. **1**). In some implementations, the client device may be associated with a user of the online patient community system **100** (FIG. **1**).

Server **112** accesses (**1520**) information indicative of a patient profile of the user, e.g., from data repository **114**. In an example, profile information stored by the online patient community system **100** (FIG. **1**) can be accessed. In some implementations, this profile information may include the age, gender, and other physical characteristics of the requesting user.

Server **112** determines (**1530**) one or more symptoms of the user. In some implementations, one or more symptoms can be included in the user profile. In other implementations, one or more symptoms can be determined based on certain other related information in the user profile. In an example, a user's age, smoking status, exercise status, and live feed updates pertaining to shortness of breath may be used to determine a lung-related symptom.

In an example, server **112** searches (**1540**) a data repository for information indicative of one or more medical service providers who are qualified to address at least one of the one or more symptoms of the user. In an example, the online patient community system **100** (FIG. **1**) may maintain a database or other data repository that can be searched for information indicative of one or more medical service providers who are qualified to address at least one of the one or more symptoms of the user.

Server **112** identifies (**1550**) a medical service provider who is qualified to address at least one of the one or more symptoms of the user. In an example, medical service provid-

ers that are associated with treatment plans for one or more of the particular symptoms may identified as one of the one or more service providers that are qualified to address at least one of the one or more symptoms of the user. In some implementations, identifying one or more qualified service provide may include determining a number of top service providers that have higher outcome ratings relative to other service provides. In some implementations, identifying one or more qualified service provides may include determining a number of service providers that closest to the requesting user relative to other service providers. In some implementations, identifying one or more qualified service provides may include determining a number of service providers that can address more of the user's symptoms relative to other service providers.

Server **112** transmits (**1560**), e.g., to a client device, information indicative of the identified medical service provider. In an example, information can be transmitted to a client device **102** or **108** (FIG. **1**). In some implementations, the information can be presented in one or more of the user interfaces **200**-**1300** described elsewhere in this specification.

Embodiments can be implemented in digital electronic circuitry, or in computer hardware, firmware, software, or in combinations thereof. An apparatus can be implemented in a computer program product tangibly embodied or stored in a machine-readable storage device for execution by a programmable processor; and method actions can be performed by a programmable processor executing a program of instructions to perform functions by operating on input data and generating output. The embodiments described herein, and other embodiments of the invention, can be implemented advantageously in one or more computer programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at least one input device, and at least one output device. Each computer program can be implemented in a high-level procedural or object oriented programming language, or in assembly or machine language if desired; and in any case, the language can be a compiled or interpreted language.

Processors suitable for the execution of a computer program include, by way of example, both general and special purpose microprocessors, and any one or more processors of any kind of digital computer. Generally, a processor will receive instructions and data from a read-only memory or a random-access memory or both. The essential elements of a computer are a processor for executing instructions and one or more memory devices for storing instructions and data. Generally, a computer will also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for storing data, e.g., magnetic, magneto optical disks, or optical disks. Computer readable media for embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, e.g., EPROM, EEPROM, and flash memory devices; magnetic disks, e.g., internal hard disks or removable disks; magneto optical disks; and CD ROM and DVD-ROM disks. The processor and the memory can be supplemented by, or incorporated in special purpose logic circuitry. Any of the foregoing can be supplemented by, or incorporated in, ASICs (application-specific integrated circuits).

To provide for interaction with a user, embodiments can be implemented on a computer having a display device, e.g., a LCD (liquid crystal display) monitor, for displaying information to the user and a keyboard and a pointing device, e.g., a mouse or a trackball, by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, e.g., visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any form, including acoustic, speech, or tactile input.

Embodiments can be implemented in a computing system that includes a back end component, e.g., as a data server, or that includes a middleware component, e.g., an application server, or that includes a front end component, e.g., a client computer having a graphical user interface or a Web browser through which a user can interact with an implementation of embodiments, or any combination of such back end, middleware, or front end components. The components of the system can be interconnected by any form or medium of digital data communication, e.g., a communication network. Examples of communication networks include a local area network (LAN) and a wide area network (WAN), e.g., the Internet.

The system and method or parts thereof may use the "World Wide Web" (Web or WWW), which is that collection of servers on the Internet that utilize the Hypertext Transfer Protocol (HTTP). HTTP is a known application protocol that provides users access to resources, which may be information in different formats such as text, graphics, images, sound, video, Hypertext Markup Language (HTML), as well as programs. Upon specification of a link by the user, the client computer makes a TCP/IP request to a Web server and receives information, which may be another Web page that is formatted according to HTML. Users can also access other pages on the same or other servers by following instructions on the screen, entering certain data, or clicking on selected icons. It should also be noted that any type of selection device known to those skilled in the art, such as check boxes, drop-down boxes, and the like, may be used for embodiments using web pages to allow a user to select options for a given component. Servers run on a variety of platforms, including UNIX machines, although other platforms, such as Windows 2000/2003, Windows NT, Sun, Linux, and Macintosh may also be used. Computer users can view information available on servers or networks on the Web through the use of browsing software, such as Firefox, Netscape Navigator, Microsoft Internet Explorer, or Mosaic browsers. The computing system can include clients and servers. A client and server are generally remote from each other and typically interact through a communication network. The relationship of client and server arises by virtue of computer programs running on the respective computers and having a client-server relationship to each other.

Other embodiments are within the scope and spirit of the description claims. For example, due to the nature of software, functions described above can be implemented using software, hardware, firmware, hardwiring, or combinations of any of these. Features implementing functions may also be physically located at various positions, including being distributed such that portions of functions are implemented at different physical locations. The use of the term "a" herein and throughout the application is not used in a limiting manner and therefore is not meant to exclude a multiple meaning or a "one or more" meaning for the term "a." Additionally, to the extent priority is claimed to a provisional patent application, it should be understood that the provisional patent application is not limiting but includes examples of how the techniques described herein may be implemented.

A number of exemplary embodiments of the invention have been described. Nevertheless, it will be understood by

one of ordinary skill in the art that various modifications may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A computer-implemented method, comprising:

receiving, by a processing device and from a client device associated with a requesting user of an online patient community, a request to search for other similar individual users who are associated with at least a threshold level of similarity to the requesting user;

accessing information indicative of a patient profile of the requesting user;

determining, based on contents of the patient profile, one or more attributes of the requesting user;

receiving from the requesting user a specification of which attributes of the requesting user are used as medical search criteria in searching for the similar individual user;

searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the medical search criteria specified by the requesting user;

identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the medical search criteria specified by requesting user;

determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and

transmitting, to the client device, information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user;

forming a direct social connection with one degree of separation, in a social networking platform of the online patient community, between (i) a user identity of the requesting user who specified which attributes are used as the medical search criteria, and (ii) a user identity of the identified, similar user.

2. The computer-implemented method of claim **1**, further comprising:

receiving, from the client device, a request to connect the identified user to the requesting user in the online patient community.

3. The computer-implemented method of claim **1**, further comprising:

receiving, from the client device, information indicative of one or more attributes of the requesting user; and

updating the patient profile of the requesting user with the information indicative of the one or more attributes.

4. The computer-implemented method of claim **1**, further comprising:

accessing a medical data record of the requesting user;

parsing the medical data record;

determining, based on parsing, information indicative of one or more attributes of the requesting user; and

updating the patient profile of the requesting user with the information indicative of the one or more attributes.

5. The computer-implemented method of claim **1**, further comprising:

receiving, from the client device, information indicative of recovery information of the requesting user; and

sharing the received recovery information with peers of the requesting user in the online patient community;

wherein the shared recovery information increases a speed of recovery of at least one of the peers of the requesting user, relative to other speeds of recovery that result from other shared information.

6. The computer-implemented method of claim **1**, further comprising:

receiving, from the client device, information indicative of one or more of medical information of the requesting user; and

sharing the received medical information with peers of the requesting user in the online patient community.

7. An electronic system comprising:

one or more processing devices; and

one or more machine-readable hardware storage devices storing instructions that are executable to cause the one or more processing devices to perform operations comprising:

receiving, from a client device associated with a requesting user of an online patient community, a request to search for similar individual users who are associated with at least a threshold level of similarity to the requesting user;

accessing information indicative of a patient profile of the requesting user;

determining, based on contents of the patient profile, one or more attributes of the requesting user;

searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user;

receiving from the requesting user a specification of which attributes of the requesting user are used as medical research criteria in searching for the similar individual user;

searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the medical search criteria specified by the requesting user;

identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the medical search criteria specified by the requesting user;

determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and

transmitting, to the client device, information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user;

forming a direct social connection with one degree of separation, in a social networking platform of the online patient community, between (i) a user identity of the requesting user who specified which attributes are used as the medical search criteria, and (ii) a user identity of the identified, similar user.

8. The electronic system of claim **7**, wherein the operations further comprise:

receiving, from the client device, a request to connect the identified user to the requesting user in the online patient community.

9. The electronic system of claim **7**, wherein the operations further comprise:

receiving, from the client device, information indicative of one or more attributes of the requesting user; and

updating the patient profile of the requesting user with the information indicative of the one or more attributes.

10. The electronic system of claim **7**, wherein the operations further comprise:

accessing a medical data record of the requesting user;

parsing the medical data record;

determining, based on parsing, information indicative of one or more attributes of the requesting user; and

updating the patient profile of the requesting user with the information indicative of the one or more attributes.

11. The electronic system of claim **7**, wherein the operations further comprise:

receiving, from the client device, information indicative of recovery information of the requesting user; and

sharing the received recovery information with peers of the requesting user in the online patient community;

wherein the shared recovery information increases a speed of recovery of at least one of the peers of the requesting user, relative to other speeds of recovery that result from other shared information.

12. The electronic system of claim **7**, wherein the operations further comprise:

receiving, from the client device, information indicative of one or more of medical information of the requesting user; and

sharing the received medical information with peers of the requesting user in the online patient community.

13. One or more machine-readable hardware storage devices storing instructions that are executable to cause one or more processing devices to perform operations comprising:

receiving, from a client device associated with a requesting user of an online patient community, a request to search for similar individual users who are associated with at least a threshold level of similarity to the requesting user;

accessing information indicative of a patient profile of the requesting user;

determining, based on contents of the patient profile, one or more attributes of the requesting user;

receiving from the requesting user a specification of which attributes of the requesting user are used as medical search criteria in searching for the similar individual user;

searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the medical search criteria specified by the requesting user;

identifying, based on searching, a user associated with one or more attributes corresponding to at least one of the medical search criteria specified by the requesting user;

determining that the one or more corresponding attributes of the identified user satisfy the threshold level of similarity; and

transmitting, to the client device, information indicative of the identified user, with the transmitted information specifying the identified user as being a peer of the requesting user;

forming a direct social connection with one degree of separation, in a social networking platform of the online patient community, between (i) a user identity of the requesting user who specified which attributes are used as the medical search criteria, and (ii) a user identity of the identified, similar user.

14. The one or more machine-readable hardware storage devices of claim **13**, wherein the operations further comprise:

receiving, from the client device, a request to connect the identified user to the requesting user in the online patient community.

15. The one or more machine-readable hardware storage devices of claim **13**, wherein the operations further comprise:

receiving, from the client device, information indicative of one or more attributes of the requesting user; and

updating the patient profile of the requesting user with the information indicative of the one or more attributes.

16. The one or more machine-readable hardware storage devices of claim **13**, wherein the operations further comprise:

accessing a medical data record of the requesting user;

parsing the medical data record;

determining, based on parsing, information indicative of one or more attributes of the requesting user; and

updating the patient profile of the requesting user with the information indicative of the one or more attributes.

17. The one or more machine-readable hardware storage devices of claim **13**, wherein the operations further comprise:

receiving, from the client device, information indicative of recovery information of the requesting user; and

sharing the received recovery information with peers of the requesting user in the online patient community;

wherein the shared recovery information increases a speed of recovery of at least one of the peers of the requesting user, relative to other speeds of recovery that result from other shared information.

18. The one or more machine-readable hardware storage devices of claim **13**, wherein the operations further comprise:

receiving, from the client device, information indicative of one or more of medical information of the requesting user; and

sharing the received medical information with peers of the requesting user in the online patient community.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 9,256,645 B2
APPLICATION NO. : 13/968046
DATED : February 9, 2016
INVENTOR(S) : Ali Adel Hussam

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

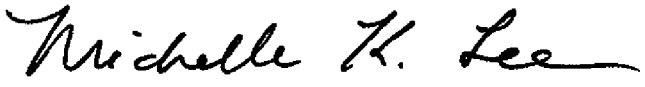
Col. 21, line 8, claim 1, delete "other similar" and insert -- similar --

Col. 21, line 25, claim 1, delete "by" and insert -- by the --

Col. 22, line 24-27, claim 7, below "user;" delete "searching a data repository for information indicative of a user associated with one or more attributes corresponding to at least one of the one or more attributes of the requesting user;"

Col. 22, line 30, claim 7, delete "research" and insert -- search --

Signed and Sealed this
Third Day of May, 2016



Michelle K. Lee
Director of the United States Patent and Trademark Office